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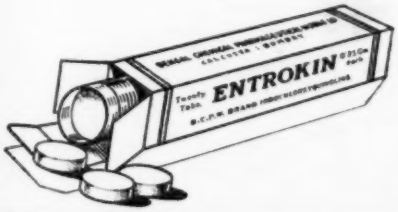

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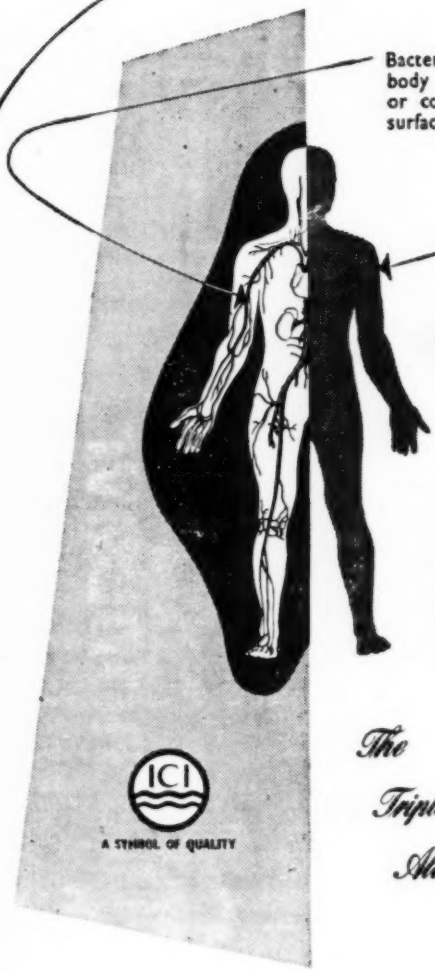

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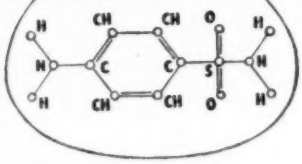

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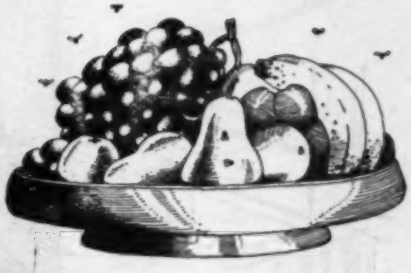

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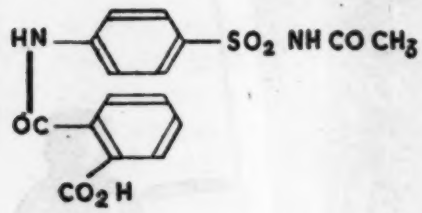

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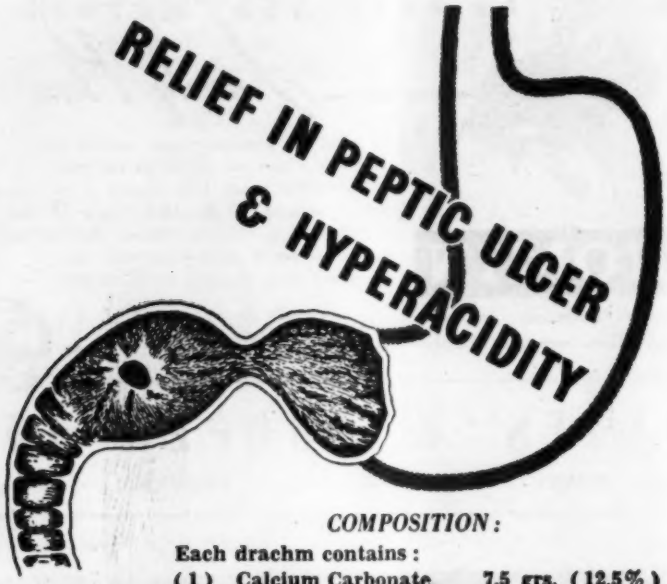

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ORIGINAL ARTICLES

LYMPHOGRANULOMA INGUINALE —RECENT TRENDS IN DIAGNOSIS AND TREATMENT

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Lymphogranuloma inguinale is a generalised virus infection, usually transmitted by venereal contact with self-healing primary sore and changes in lymph nodes draining the area. It may give rise to genito-ano-rectal syndromes and other manifestations of the genital area to meningo-encephalitis and eye lesions.

EPIDEMIOLOGY

This disease is common in the tropical and sub-tropical areas, observed often among coloured races and in seaports all over the world. It is quite common in south-east Asia.

Prevalence in the Visakhapatnam area (India) is moderate and Table 1 gives the figures.

TABLE 1

	Male	*Female*	*Total*
1950	117	34	151
*1951	62	36	98

* This does not represent annual incidence.

BACTERIOLOGY

The disease is caused by a virus of the psittacosis lymphogranuloma trachoma group. It has been transmitted to monkeys and higher apes easily.

The virus is about 200 m.u. but in tissue and other earlier cultures they assume mega-forms and may approximate the size of Staphylococci (Bedson, 1950). (Fig. 1 *vide* Plate).

It passes Berkefeld, Seitz and coarse Chamberland filters. The virus can be demonstrated easily under the ordinary microscope stained by basic stains. By Castenada and Geimsa stains this virus is seen as bluish purple bodies both extra- and intra-cellular (Fig. 2 *vide* Plate).

The virus grows well in embryonic tissues, embryonated egg membranes and intraperitoneally or intracerebrally in mice. The procedure adopted in this work is yolk sac cultures in eggs as advised by Beveridge and Burnett. 5 to 6 day incubated eggs are given ½ c.c. of previously isolated suspension direct into the yolk sac and incubated till the embryo dies. The eggs are harvested, yolk sac separated and ground in Ten Brock's tubes all in a sterile manner. Later the ground suspension is centrifuged at high speed for one hour and the supernatant fluid with yolk cell debris is pippetted off, the virus having been packed at the bottom of the tube. Three washings are done as above and later the virus is resuspended in buffer saline at 2 c.c. per each yolk sac. This suspension can be used for continuing the virus for cultures or frozen for future use, or made into antigen. The suspension is checked for its viral content by comparative staining

For antigen, the above suspension is inactivated by boiling in a water bath for half an hour. The antigen is standardised in the usual way for its complement fixing ability, anticomplementary activity, and its potency. The help of an old antigen was taken and a known positive serum used as control.

DIAGNOSIS

DIAGNOSTIC TESTS: 1. *Frei's Test*—is an intradermal test using Frei's antigen, as described by Frei in 1925. The original method is to withdraw pus from a clinically definite case of L. G. I. with an unburst fluctuant bubo, dilute the same 1 in 5 in physiological saline, and heat upto 60°C for 2 to 3 hours in a hot bath, distribute in small quantities of 0·5 c.c. each and store at low temperatures. This antigen was given intradermally the quantity used being 0·1 ml. A control with physiological saline was also done at the same time. Area of reaction in 24-48 hours at the test site may vary from ½ to 2 cms. with no reaction at the saline area.

Fallacies in this method are: (*a*) the question of the viral content of the fluid used (*b*) the possibility of Ducrey's infection either alone or superimposed in the bubo fluid from which it was made. As some such workers use instead of the saline control in the above test Ducrey's antigen (dmelcos vaccine).

The modern method of using the yolk sac or mouse brain antigen is more scientific. Rake, McKee and

Schaffer (1940) used purified concentrated yolk sac antigen preserved in formalin. This is conveniently exported as Lygranum S. T. by Squibbs. The control used in this method being normal yolk sac antigen, is prepared in exactly the same way as the antigen proper, but with uninoculated eggs and the centrifugalisation being rather less onerous. This eliminates undue allergic reaction in the patient tested, for yolk sac proteins.

The reaction noted in the intradermal test is read 48-72 hours later, by the appearance of a papule surrounded by an areola. The reaction zone may be from 0·5 cm. to 2 or 3 cms. Sometimes ulceration may also occur. This reaction slowly disappears and may take a week or two. It may leave a pigmented spot. (Bedson, 1950).

The procedure used here was as modified by Bedson and Barwell (1949) and the original strain of virus used was the ' Kam ' strain as supplied from cultures in a freezedried state by them.

Barwell (1949) claimed specific results with acid extracts of the virus and further work is awaited.

2. *Complement fixation test* (*C.F.T.*)—Here as in Frei's test it is the group antigen that plays the part. The specific antigen is heat labile whereas the group antigen is heat stable. Cross fixation is possible in lung infections like P.A.P., ornithosis etc. It is possible to eliminate the group antibody from the serum to be tested, by absorption with group antigen and performing the test with live L.G.I. virus unheated. as the antigen (Bedson *et al*, 1949). But it is not suitable ordinarily as the complement fixing titre falls low and also the hazards of working with live virus.

The heated phenolised antigen is used containing only the group antigen and any fixations of over 1/32 serum dilution is taken as positive. This result combined with a positive Frei's test and clinical findings is diagnostic of active L.G.I. infection. Here also a normal yolk sac antigen should be used as a control in the test.

C. F. test becomes positive earlier than Frei's test (Rake and Schaeffer, 1940) and this is illustrated by Case 10.

3. *Demonstration of virus in pus from buboes*—The pus from unburst buboes could be inoculated into yolk sac of incubated eggs or better still intracerebrally in mice. Any secondary infection can be excluded by the use of streptomycin. Penicillin should not be used as the L.G.I. virus has been found to be sensitive to it *in vitro* (Bedson, 1950). It takes a few passages to isolate the virus and death of the embryo may not occur on the appointed day. Still the egg should be harvested as usual and further passages undertaken. The virus slowly increases in its virulence and may assume formidable proportions (Grace and Suskind, 1936).

This method is time-consuming and is not invariably successful. Rake *et al*, (1940) have described great success in this method but Bedson (1950) has not been very successful in this way as a routine diagnostic procedure.

4. *Serum Proteins*—It has been noted as in certain other chronic infections that there is an increase in the serum proteins and a reversal of the albumin-globulin ratio. This is generally seen and as the disease clears up there is a tendency to return to normal. But this feature in serum proteins is not specific.

Pathology

Granuloma forms the unit of pathological lesion. A collection of reticulo-endothelial cells starting round the small vessels and showing central necrosis is the picture. There is a preponderant infiltration of tissues with plasma cells and lymphocytes and histiocytes and a few giant cells. There is no pus seen but the necrotic material from the granulomatous nodules and cells is responsible for the thick, tenacious, viscid puslike material ordinarily met with (Fig. 3, *vide* Plate). Virus can be demonstrated with difficulty. Miyagawa *et al*, (1936) have described intracytoplasmic inclusions in sections.

Signs and Symptoms

The primary sore of L.G.I. is rather evanescent and is more often missed than seen. Durand (1913) and later Hanschell have described herpetiform ulcers. The regional adenitis takes about 3 weeks to develop after the exposure to infection. This may be unilateral or bilateral, the incidence being equal. The adenopathy spreads to deeper glands like the internal iliac and lumbar groups. The group as a whole gets affected with a lot of periglandular inflammation or periadenitis and the glands get anchored and adherent to surrounding structures. The enlargement of glands may assume large proportions. Fistulous openings ensue and multiple sinuses occur exuding thick sticky, rather clear fluid at first, which later turn purulent owing to secondary infection. This type is more common in men than women.

In women the commonest type is esthiomene and stricture of the rectum. This is due to the primary infection being in an area whose drainage leads to the perirectal group of lymph glands. Ulceration of the vulval region, elephantoid state of the tissues are the rule, which may lead to the genito-ano-rectal syndrome complex. Strictures of the vagina and proliferative type of lesions are also not uncommon.

Stokes classifies the clinical manifestations as follows:

1. Genital variety inclusive of abacterial urethritis.
2. Inguinal variety.
3. Pelvic variety.

4. Anorectal variety:
   (*a*) Perianal œdema and ulceration.
   (*b*) Fistula-in-ano.
   (*c*) Perianal abscesses.
   (*d*) Anorectal stricture.

The rectal lesions are further classified as:

   (*i*) Proctitis alone.
   (*ii*) Proctitis with stricture.
   (*iii*) Stricture alone.

5. Ulcerative colitis.

6. Extra genital and other manifestations in eye, bones, nervous system, skin etc.

Table 2 provides the classification of cases treated in 1951.

TABLE 2

	Men	*Women*
Inguinal variety	53	16
Anorectal variety	5	6
Proliferative variety	Nil	3
Ulcerative variety	4	11

Diagnosis of cases was based on the following criteria:

(*i*) Clinical syndrome.

(*ii*) Positive Frei's test—over 5 mm. reaction using yolk sac antigen.

(*iii*) A positive C.F.T. for L.G.I. of over 1/32 serum dilution titre.

(*iv*) Serum proteins—an increase in total and tendency for complete reversal of albumin-globulin ratio (subsidiary).

TREATMENT

GENERAL TREATMENT:

(*a*) Surgical when necessary: The inflamed gland could be excised or suppurating sinuses laid open.

(*b*) Rest and clean dressings go a long way in cure.

(*c*) Protein shock therapy especially with graded doses of I.V. T.A.B. vaccine.

(*d*) Vaccine therapy from excised tissues.

(*e*) Drugs:

(*i*) Antimony compounds like Anthiomaline Fantorin, Stibinol etc., give a great amount of relief and healing.

(*ii*) Chemotherapy with sulpha group of drugs have a definite value and many of the inguinal variety gets 'cured. This treatment may be complemented with antimony and is of great benefit.

(*iiii*) Antibiotics—*Penicillin* has definite action on the virus *in vitro* but has not found extensive trials clinically. In high doses it produces an amelioration of symptoms mainly by overcoming the secondary infection but has no definite action on the healing process as such.

Chloramphenicol—Is being reported favourably but our experience on one isolated case shows its beneficial effect.

Aureomycin—Reports on the efficacy of aureomycin all over the world prove favourably. We have used it in 12 cases with remarkable results. The spectacular striking feature was the rapidity with which the lesions healed and consequent short stay in hospital. Four clinical types of the conditions were put on the drug with good response.

The inguinal variety responded quickly with low dosages of 10 to 15 gms. The ulcerative and small proliferative types showed healing and recovery on doses of 20 to 30 gms.

In anorectal variety the cases with proctitis alone, responded well. Proctitis with stricture reacted with cessation of the foul blood-stained discharge with an accompanying resiliency in the strictures. This may be due to the irritative spasm of the rectal mucosa being relieved by healing of the infective lesions. This fact is important since these cases could be attended to further by surgical methods like dilatation etc. But once a fibrocicatricial stricture has formed aureomycin is of no use except to stop the further progress of the disease by checking the infection, which stands to reason.

TREATMENT OF COMPLICATIONS—Anorectal syndrome if completely set in with cicatricial stricture, is beyond the province of medicamenta and has to be handed over to the surgeon for dilatation, if possible, or for resection of the rectum. Proliferative type of lesions if small respond well to treatment but large polypoid masses and pedunculated warty growths have to be surgically attended to. Stricture of the vagina has the same place as stricture of the rectum in treatment.

ANTIBODY LEVEL IN TREATMENT WITH AUREOMYCIN: A significant fact noticed on cases treated with aureomycin was that the C.F.T. for L.G.I. done on a quantitative basis was found to drop down quite appreciably, few months after the cessation of treatment. It is regretted that this was done on only five cases of the series due to difficulties of follow up.

TABLE 3

	Case 2	*Case* 3	*Case* 4	*Case* 5	*Case* 8
Frei's test zone of reaction ...	15 mm.	20 mm.	25 mm.	18 mm.	22 mm.
C. F. T. before treatment ...	1/128	1/128	1/256	1/256	1/256
C. F. T. after treatment ...	1/32	1/16	1/16	1/64	1/32

The time interval was over 3 months and under 6 months between the complement fixation tests.

The above fact is significant if it sustains that the antibody or regain level in the serum is dropping down after treatment. If so, aureomycin has a definite place in the treatment of L.G.I. as shown by clinicoserological improvement and has an antiviral effect, over the virus of L.G.I.

Parallel tests on other therapeutic drugs lack control in this manner. Being statistically insignificant one is prevented to venture further premature conclusions.

Case Reports

Only the chief clinical, laboratory and therapeutic findings are recorded.

Case 1—M. V. 2356, male: Bilateral buboes with matting; fluctuations present. No penile lesion. B.W.R.—negative. Frei's test—positive, C.F.T. for L.G.I. 1/64.

Chloromycetin one gramme a day for 15 days was given with complete subsidence of buboes.

Case 2—F. V. 51, female: Presented anorectal syndrome; blood-stained discharge per rectum, obstinate constipation and thin thread-like stools. P.R.—stricture rectum 2" above anal margin and just admitting the little finger. B.W.R.—negative; Frei's test—positive, C.F.T. for L.G.I.—1/128; serum proteins—reversal of albumen-globulin ratio.

Aureomycin one gramme a day for 20 days was given. Discharge completely stopped, condition of the stricture was nearly the same as before and was referred to the surgeon for dilatation. Five months later C.F.T. was 1/32.

Case 3—M. V. 423, male: Presented anorectal syndrome. History of blood stained motion—obstinate constipation. P.R.—stricture 1" above anal orifice admitting easily index finger with ulcerated mucous membrane. B.W.R.—negative; Frei's test—positive, C.F.T. for L.G.I.—1/128. Serum proteins showed changes.

Aureomycin one gramme a day for 30 days was given. Complete healing of ulceration was observed with a resiliency in the stricture. Three months later he was asymptomatic but there was still a roughness of the rectal mucosa and two fingers could be passed easily. C.F.T. for L.G.I. was 1/16 This case was a moslem and had been circumcised early in life.

Case 4—P. R. female, came for relief of anorectal syndrome. History of blood and pus per rectum. P.R.—showed indurated masses 1" above the anal orifice with ulceration all round. B.W.R.—negative; Frei's test—positive, C.F.T for L.G.I.—1/256. Serum proteins showed reversal.

Aureomycin one gramme a day for 20 days was given. By the end of the treatment the anal mass had nearly disappeared, ulceration had healed and there was no discharge.

Six months later she was free from the malady. P.R. was normal and C.F.T. was 1/16.

Case 5—F. V. 644, female: Proliferative type of L.G.I., foul discharge per rectum. The anal margin showed small polypoid growths extending into the anal canal which was also ulcerated. No stricture was felt. B.W.R.—positive; Frei's test—positive; C.F.T. for L.G.I.—1/256. Serum proteins showed reversal.

Aureomycin one gramme a day for 20 days was given. The discharge stopped and slowly the growths withered off Two months later she had no complaint and the C.F.T. for L.G.I. was 1/64.

Case 6—F. V. 1304, female: Admitted for ulcerative type of L.G.I. with proctitis. Blood and pus per rectum. P.R.—showed ulceration extending 2" above anal margin. No stricture. B.W.R.—positive; C.F.T. not done. Serum proteins showed changes.

Aureomycin one gramme a day for 16 days was given. with complete cessation of symptoms and healing of the ulceration. Follow up awaited.

Case 7—M. V. 1791, male: Bilateral buboes showing ulceration and multiple fistulæ. No penile lesion. B.W.R.—positive; Frei's test—positive. C.F.T. for L.G.I.—1/256.

Aureomycin 1 gramme a day for 10 days was given and the lesions were healing nicely but the patient left the hospital noticing improvement in his condition.

Case 8—M. V. 1035, male: Matted glands, bilateral with areas of fluctuation. No penile sore. B.W.R.—positive; Frei's test—positive, C.F.T. for L.G.I.—1/256. Serum proteins showed changes.

Aureomycin one gramme a day for 15 days was given. The adenopathy subsided completely at the end of treatment. Three months later his B.W.R. was negative and C.F.T. 1/32.

Case 9—M. V. 1425, male: Admitted for hypertrophic type of A.R.S., small hypertropic lesions round the anal margin with bleeding and discharge per rectum. P.R.—no stricture was felt but there was slight proctitis. B.W.R.—negative; C.F.T. for L.G.I.—1/128.

Aureomycin one gramme a day was started. Marked improvement was seen with retrogression of the lesions and cessation of discharge but the patient absconded on 8th day.

Case 10—M. V. 2202, male: Bilateral inguinal buboes—inflamed with a few areas of fluctuation. No sore on genitalia. B.W.R.—positive; Frei's test—negative; C.F T. for L.G.I.—1/64.

Aureomycin one gramme a day for 10 days was given and was discharged healed. Follow up awaited.

Cases 11 and 12—M. V. 1784 and M. V. 1859: males. These were two cases of inguinal variety with suppuration and were put on aureomycin, responded well but went away from hospital before treatment was completed and could not be traced.

Note—Although Frei's test was negative, a positive C.F.T. of 1/64 and unequivocal clinical findings necessitated treatment on the lines of L.G.I. The therepeutic response confirmed that a positive C.F.T. may precede a diagnostic intradermal allergic reaction.

Summary

1. Literature on L.G.I. is reviewed.

2. The cultural aspect in the diagnosis of L.G.I., the production of the antigen for Frei's test and the C.F.T. are discussed.

3. The role of the C.F.T. in diagnosis and prognosis of L.G.I. is illustrated by case records.

4. The decrement in the C.F.T. in a few L.G.I. cases recorded is significant and may be used with

obesity

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5 mg. or 10 mg.
Ointment of Testosterone Propionate-Boots
2.5 per cent in a water-miscible base.

PROGESTOGENS

Luteostab Brand Injection of Progesterone, B.P.
1 ml. ampoules, 2 mg., 5 mg. or 10 mg.
Tablets of Ethisterone, B.P.-Boots
5 mg. or 10 mg.

Literature and further information obtainable from the Medical Information Department
BOOTS PURE DRUG CO. (INDIA) LTD.
Asian Buildings, Nicol Road, Ballard Estate, Bombay

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advantage as a therapeutic guide, in the treatment of these cases with specific antibiotics. This is in parallel with the quantitative serological tests in vogue in the treatment of syphilis.

5. The clinical records appended impress the therapeutic effects of aureomycin in this disease.

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REFERENCES

BARWELL—*Nature*, **162**: 460, 1948.

Idem—Ibid, **164**: 1013, 1949 and unpublished reports.

BEDSON—*Brit. J. Ven. Dis.*, **26**: 117, 1950.

BEDSON *et al.*—*J. Clin Path.*, Nov. 1949.

BEVERIDGE AND BURNETT—M. R. C. Series No. 256. Cultivation of Viruses.

GRACE AND SUSKIND—*Arch. Dermat. & Syph.*, May 1936.

MIYAGAWA *et al.*—*Jap. J. Exper. Med.* June 20, 1936.

RAKE, SCHAEFFER AND MCKEE—*Proc. Soc. Exper. Biol & Med.*, **43**: 332, 1940.

FROG (*RANA TIGERINA*) TEST IN THE DIAGNOSIS OF PREGNANCY

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The stimulating effect of gonadotrophins on the male gonads was known as early as 1930 (Bourg, 1930), and has been a subject of extensive study during the following years. However, it was not until 1947, that male *Salientia* (Mainini, 1947) were made use of in the diagnosis of pregnancy. The practical utility of this simple, and comparatively inexpensive procedure soon became obvious. The test has been employed by different observers in different parts of the world, using different varieties of toads and frogs for this purpose. At least 34 varieties of *salientia* have been used so far for the test, with more or less satisfactory results. The credit of the use of the Indian varieties of these animals is due to Bhaduri (1951), who has tried more than 9 species of Indian toads and frogs. However, the reported results of this author (1951), and his collaborator, Bardhan (1949), are based on the results obtained in the male toad (***Bufo melanostictus***). The common Indian frog, ***Rana Tigerina*** does not appear to have been employed for any large scale investigation. For several years the authors have used both these varieties of *Salientia* for the diagnosis of pregnancy conditions. Our experience has been that, while the *Bufo* is a good experimental animal the responses obtained with ***Rana Tigerina*** are more satisfactory. From a study of the literature it appears that neither of these tests has received the consideration in this country it deserves in view of its cheapness and easy applicability. Mainini (1947a) noted that the response of these animals in a warm country, and in warm environments is very satisfactory. The climate of India is highly suitable for a wide application of the toad and frog test for the diagnosis of normal and abnormal pregnancy. The present communication is an attempt to show the value of this test in an unselected series of cases studied by the authors.

METHOD

1. *Collection of urine*—In the earlier stages of this investigation only early morning specimens of urine were employed. In the course of this work it was observed that, unless the gonadotrophin titre in the urine is low, as happens in the pre-parturient state, missed abortion, and intrauterine death of the fœtus, this precaution is not absolutely necessary. Ordinary urine, unless the specific gravity is less than 1010, is sufficient for the test. When this gives a negative result, concentration of gonadotrophins (*vide infra*) is more satisfactory than repeating the test with early morning urine. A catheter specimen is not necessary. Between the time of collection and injection, the urine is kept in an ice box. Preservatives are not required. If the urine has been stored for a long time, or if putrefactive changes have set in, it is advisable to concentrate gonadotrophins, in the manner described below, otherwise the urine often proves toxic to the animals.

2. *Concentration of urinary gonadotrophins*—Usually unconcentrated urine is employed for the test. In presence of a doubtful, or negative result concentration of gonadotrophins is indicated. The method is as follows: To 10 ml. of urine is added acetic acid drop by drop, with stirring, until it is acid to litmus. Acetone 20 ml. is then added to the urine. The mixture is thoroughly shaken, and kept at room temperature for 15 minutes. It is then centrifuged, and the supernatant fluid is decanted off. The precipitate is stirred with 5 ml. of ether, and centrifuged again. The ether is drained off, the precipitate is allowed to dry, and then taken up in 2 ml. of normal saline. It

the urine is stale, and contains organic deposits it is filtered before acidulation.

3. *Choice and isolation of frogs*—The frogs employed in this series were *Rana Tigerina*. Only medium-sized animals, weighing from 100 to 160 gm. were found most satisfactory. Oversized frogs often give a negative result with the standard dose of urine used for routine qualitative pregnancy diagnosis test, unless the gonadotrophin titre is very high. Frogs weighing less than 100 gm. sometimes die as a result of the injection. They were, therefore, found uneconomical for use in pregnancy diagnosis centres. There is little difficulty in identifying the male frogs from the submandibular pouch, and the padding of the thumbs they possess. Male frogs can be herded together in one frog chamber until the time of the test. During the test each frog is isolated, and kept in numbered cage (or a jar with a perforated lid). The frogs which have been treated are kept isolated from the untreated ones for one week, after which they can be used again.

4. *Injection of animals*—For the purpose of ordinary pregnancy diagnosis the amount of urine injected is 5 ml. The reaction of urine is adjusted in order to make it faintly acid to litmus. The same rule is observed when concentrated gonadotrophin is employed. The injection is made into the dorsal lymph sac. Frogs' skin is tough and inelastic. So on withdrawal of the needle some of the urine is lost through leakage. In order to prevent this, the needle is introduced where the thigh joins the back, and its tip is pushed into the lymph space upto the mid-dorsal region, where the injection is made. These animals have a slippery skin, and usually object to the disturbance created by the injection. So, they should be wrapped in a piece of cloth, keeping the back exposed, and held firmly. The legs are gripped strongly, and kept extended during the injection. It has been our practice to empty the cloaca by pressure and irritation before the injection is given. This, however, is not absolutely essential.

5. *Test of Spermatogenesis*—This is done by examining the cloacal urine for the presence of spermatozoa. The urine is obtained by introducing a thin rubber-teat pipette into the cloaca. One drop of this urine is examined in a wet cover-slip preparation under the microscope with a high power objective. Before the injection of urine is given a sample of cloacal urine is examined, and if this contains sperm cells the animal is not suitable for the test. After the injection examinations are made every half an hour on fresh samples of urine collected each time, for 2 hours. If these do not contain any spermatozoa further examinations at the third and fourth hours are indicated before the test is considered negative. However, before a negative result is reported, the test is repeated after concentration. Presence of spermatozoa, motile, or non-motile at any stage of the test after the injection indicates a positive result.

The pregnancy diagnosis test, with *Rana Tigerina* as the test animal was performed on 268 specimens of urine, obtained from the same number of subjects. Of these 241 were hospital cases, and 27 were patients of doctors employed in private practice. In no instance was the clinical condition of the subject known. Urine was collected in the hospital from the wards of one of the authors (C.M.) by a house staff, who maintained a register, and alone was in the knowledge of the patient's condition. The label on the specimen bottles contained only a serial number, and provided no other data. The case histories were consulted, and the diagnosis known when the results presented here were being compiled.

RESULTS

The results will be presented in two series depending on whether an obstetric condition was present or not.

FIRST SERIES: *Non-Obstetric Cases.* In 51 instances urine from non-obstetric cases were examined. Of these 49 tests were negative. Two urines gave positive reactions. One, where the test was strongly positive, was from a case of chorionepithelioma. The diagnosis in this case was confirmed by histological examination of the uterus removed at operation. The other was from a case of dysgerminoma of the ovary. The genital tract was infantile, and the tumour showed signs of malignancy. Here the test was weakly positive. Spermatogenesis was scanty, and evident 2 hours after the injection. An analysis of these cases is shown in Table 1.

TABLE 1—ANALYSIS OF THE RESULTS OF THE FROG TEST IN NON-OBSTETRIC CASES

Nature of Cases	*No. of Cases*	*Results*	
		+	−
Normal Males	3	...	3
Normal Non-pregnant Females	9	...	9
Female Sterility	4	...	4
Female Climacteric ...	3	...	3
Functional Uterine Hæmorrhage	5	...	5
Prolapsus Uteri	6	...	6
Perineal Tear	2	...	2
Retroverted Uterus ...	1	...	1
Chronic Salpingitis ...	2	...	2
Pseudomucinous Ovarian Cystadenoma	4	...	4
Dysgerminoma Ovarii ...	1	1 (Weak)	...
Uterine Polypi	2	...	2
Fibroid Uterus	3	...	3
Carcinoma Corpus Uteri ...	1	...	1
Carcinoma Cervix Uteri ...	3	...	3
Chorionepithelioma ...	1	1 (Strong)	...
Incompatible Blood Transfusion	1	...	1

SECOND SERIES: *Obstetric Cases.* The obstetric cases furnished 217 specimens of urine obtained from the same number of patients. For the convenience of description, these cases will be divided into three groups.

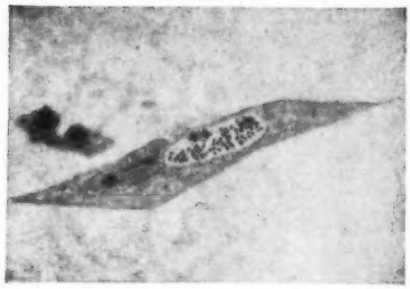

FIG. 1—Shows intracellular viral bodies of L. G. I. recovered from tissue culture. (Casteneda method of staining × 1000).

(Courtesy of Prof. S. P. Bedson of London Hospital.)

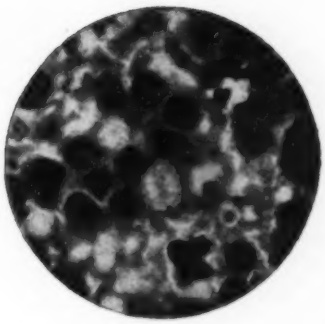

FIG. 2—Shows in the centre of the field a vacualated clear cell, bordered by three dark-stained nuclei. Contains multiple minute cytoplasmic elementary bodies. (Geimsa Stain × 1000).

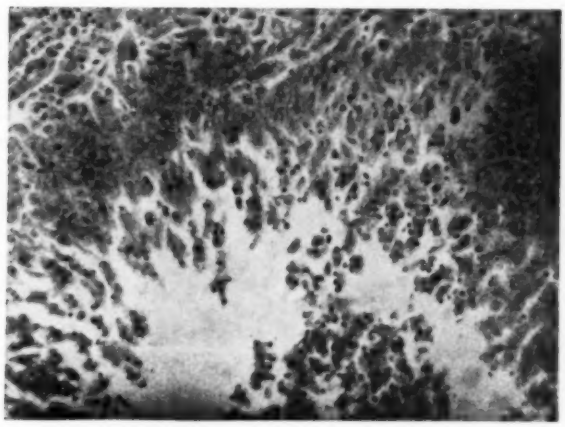

FIG. 3—Shows section of a lymph node, the centre of which contains cellular debris bordered by inflammatory cells. (H & E × 40).

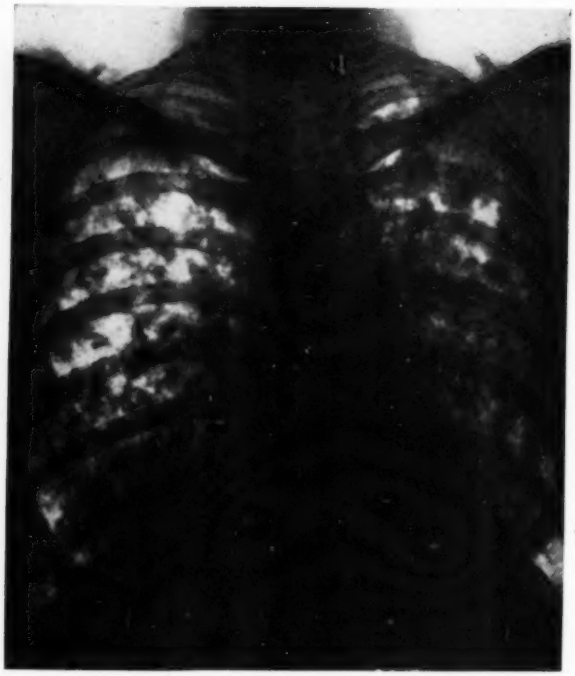

FIG. 1

JAYARAM—*Blastomycosis of Lungs*

FIG. 1

FIG. 2

SUBRAMANIAM—*Actinomycosis of the Lungs*

Group 1. NORMAL PREGNANCY—This group consists of 145 cases. The duration of gestation was from the first month to term. In all cases the fœtus was alive, and judging clinically, pregnancy was progressing normally. Twenty-eight cases were in the first trimester, 53 in the second trimester, and 64 in the third trimester of gestation. Earliest pregnancy noted in this group was one of 5 weeks. In the first and second trimester of gestation, all cases (100 per cent) gave a positive reaction. The intensity of the reaction. however, varied in these two groups. In the first trimester all cases gave strongly positive results. In the middle trimester similar reaction was observed in 75·5 per cent of cases. In the last three months of pregnancy including 5 cases where labour had just started, accuracy was not so great. In 4 cases (6·8 per cent) negative results were recorded. Of these negative cases, 2 patients had started labour when urine was collected. The other two cases were carrying 40 weeks. In all these four cases the course and outcome of labour were normal, and both fœtus and placenta were healthy. Strongly positive results were obtained in 3 cases (5·1 per cent) only. One of these patients had Rhesus factor incompatibilty, one gave birth to an anencephalic and iniencephalic monster, and the third a multipara, although not a diabetic subject, had an 11 pound 9 ounce baby at term. In the remaining cases the intensity of reaction was either weak (29·7 per cent), or moderate (59·4 per cent). In the whole series of 145 cases of pregnancy, there were 141 positive results, *i.e.*, an agreement of 98·6 per cent. The details are shown in Table 2.

TABLE 2—RESULTS OF FROG TEST IN NORMAL PREGNANCY AND LABOUR

State of Pregnancy	No. of Cases	Results			
		Weak +	Moderate +	Strong +	Negative
6-12 Wks.	28	...	...	28(100%)	...
13-27 Wks.	53	...	13(24·5%)	40(75·5%)	...
28-40 Wks.	59	16(27·1%)	38(64·4%)	3(5·1%)	2(3·4%)
Labour	5	3(60·0%)	...	...	2(40·0%)

Group 2. PUERPERIUM—There were 19 cases in this group. Seven patients were between the first and fifth day, 6 between the sixth and the tenth day, and 6 in the third week of puerperium. In the first week (1 to 5 days) all tests were positive, 5 gave a moderate reaction, and 2 a weak reaction. In the second week (6 to 10 days) 3 gave a weakly positive test, and 3 were negative. No difference was observed in the clinical behaviour of these two sets of patients. In the third week (14 to 22 days) all tests were negative. It may be of interest to note that 2 of these patients had retained placenta at the time of the test, as the clinical condition of the patients prevented a manual removal of the after-birth at an earlier date. One patient not included in this series is mentioned merely for an academic interest. She was admitted into the hospital with a retained placenta, shock and pyrexia 6 hours after confinement outside. Tests were done every day on this patient until the uterus was believed to be empty. For the first 2 days the test was moderately positive. From third to the eighth day weakly positive reactions were obtained. On the ninth day the test became negative, and continued to remain so until the patient left the hospital on the twenty-third day after admission. The results in the puerperal cases are shown in Table 3.

TABLE 3—RESULTS OF THE FROG TEST IN PUERPERIUM

Days of Puerperium	No. of Cases	Results			
		Weak +	Moderate +	Strong +	Negative
1-5	7	2(28·6%)	5(71·4%)	...	...
6-10	6	3(50·0%)	...	...	3(50·0%)
14-22	6	...	...	...	6(100·0%)

Group 3. ABNORMAL PREGNANCY—This group includes 53 cases. The conditions in which the tests were performed are presented separately.

(*i*) Intrauterine Death of the Fœtus. There were 17 cases in this series. At the time of the test a clinical diagnosis was made in 12 cases. In 9 patients the test was negative. In 3, a weekly positive test was recorded. In all positive cases the fœtal movement had stopped 5 to 8 days before the test was done. The presumed duration of fœtal death in the negative cases was from 8 to 19 days. In the remaining 5 cases in this series the diagnosis was doubtful owing to discrepancy between the history and clinical findings. The test was weakly positive in 1, and negative in 4 cases. The incidence of accuracy in intrauterine fœtal death was 76·5 per cent (13 out of 17 cases).

(*ii*) Twins and hydramnios. There were 4 cases of twins, and 3 cases of hydramnios in this series. All gave a positive reaction. Strongly positive results were obtained in 3 out of 4 cases of twins, and 1 case of hydramnios. These three twin pregnancies had also manifestations of pre-eclamptic toxæmia. Two of them were of the uniovular type. The case of hydramnios where the test was strongly positive, had a chorioangioma of the size of a marble, in the placenta.

(*iii*) Toxæmia of pregnancy. Besides the 3 cases of twins just mentioned there were 8 cases of pre-eclampsia in this series. All patients were in a severely

* Weak + = Few spermatozoa in the cloacal urine 2 hours after injection.

Moderate + = Fair number of spermatozoa in the cloacal urine between one to two hours after the injection.

Strong + = Numerous spermatozoa in the cloacal urine between half to one hour of the injection.

toxic state, and were between 32 and 36 weeks of pregnancy. All patients gave a positive test, strongly positive reactions being obtained in 6 cases. It may be of interest to mention that the œdema fluid in these patients also gave strongly positive results.

(*iv*) Abortions. The test was done on 21 cases admitted as abortions. One patient in this group deserves special mention. The test was strongly positive. Six hours after admission this patient was examined by one of the senior gynæcologists of the hospital, and a diagnosis of ectopic gestation made. Laparotomy showed a tubal pregnancy with an early tubal abortion. The gestation sac was still attached to the fallopian tube.

Of uterine abortions 8 were early, with scanty bleeding of less than 12 hours duration. All patients were between 10 to 16 weeks pregnancy. One negative, and 7 positive results were obtained. In the negative cases slight bleeding continued for about 2 weeks, after which the uterus was evacuated, and a carneous mole removed. In the positive cases no correlation could be observed between the intensity of the reaction and the outcome of the pregnancy. In fact, in 2 cases in this group, where the pregnancy continued to term, the test, at the time of the abortion was only moderately positive.

The test was done on 9 patients admitted with incomplete abortion. In 3 cases it was weakly positive. The history of bleeding was of 6 to 8 days duration, and fairly large pieces of placenta were removed at operation in these patients. In 5 patients, where the test was negative, bleeding persisted for 2 to 4 weeks, and operation revealed fibrinoid changes and degeneration in the placental remains. In 1 patient a strongly positive result was obtained. Here bleeding had persisted for nearly 12 days, and histological examination of the placental tissue removed from the uterus showed hydatidiform degeneration of the chorion.

Three cases in this series were clinically diagnosed as hydatidiform mole. In 2 the test was strongly positive, and examination of the products of conception confirmed the diagnosis. The other patient gave a negative result, and subsequently proved to be a case of missed abortion. Table 4 shows the results obtained in abnormal pregnancy.

Amount of Chorionic Gonadotrophin Required for Spermatogenesis in Frogs. Pure chorionic gonadotrophin supplied by the British Drug Houses was employed for the assay. The animals were weighed and numbered. Three sets of experiments were done. Each set consisted of 5 animals. According to weight these 5 frogs were given 10, 15, 20, 25, and 30 I.U. (per 100 gm.) respectively of gonadotrophin. The first positive reaction (presence of spermatozoa in the cloacal urine) at the end of 2 hours was regarded as the minimum effective dose. The findings were uniform in all three sets of animals. The minimum effective dose of chorionic gonadotrophin frogs was found to be 20 I.U. per 100 gm. of frog-weight.

On the basis of this finding, quantitative assay of gonadotrophins was done in a small series of cases. The values observed in these cases are given below. The authors hope to present a detailed report of a larger series in a future communication.

1. Early pregnancy (8 to 12 weeks)	... 6 cases	90,000—48,000	I. U./Litre.
2. Late pregnancy (36 to 38 weeks)	5 cases	12,000—2,000	,,
3. Hydatidiform mole	2 cases	92,000—79,000	,,
4. Chorionepithelioma	1 case	106,000	,,
5. Toxæmia of pregnancy ...	... 4 cases	32,000—10,000	,,

Use of the Same Animal for Repeated Tests. Normally the same animal is not used oftener than one week. But experiments were undertaken in order to determine the utility of this test for laboratories equipped with a small froggery. For the purpose of this

TABLE 4—RESULTS OF THE FROG TEST IN ABNORMAL PREGNANCY

Nature of Cases	*No. of Cases*	*Results* +	++	+++	−	*Remarks*
Intra-uterine Death of Fœtus	17	4*	...	...	13	*Positive upto 8 days.
Twins ...	4	1	...	3*	...	*Two twins uniovular.
Hydramnios ...	3	1	1	1*	...	*Chorioangioma of placenta.
Pre-eclampsia ...	8	...	2	6*	...	*Oedema fluid also strongly positive.
Threatened Abortion ...	7	3	2*	2	...	*Pregnancy continued to term.
Missed Abortion	2	...	...	...	2	
Incomplete Abortion ...	8	3*	...	...	5	*Large placental pieces removed 6-8 days after bleeding.
Hydatidiform Mole	3	...	...	3	...	
Tubal Pregnancy ...	1	...	...	1*	...	*Operation, early tubal abortion, intact gestation sac.

experiment it was considered essential that the duration of spermatogenesis induced by a single injection of chorionic gonadotrophic hormone should be known. A large series of animals showed that the cloacal urine becomes negative 24 hours after the injection. Majority of animals became negative in less than 12 hours.

In order to study the effect of repeated injections, 2 untreated animals were employed. One received the same quantity of pure chorionic gonadotrophin every day, and the other was given daily injections of 5 ml. of urine from a case of normal pregnancy of 32 weeks gestation. The cloacal urine was collected in the usual manner 1 hour after the injection, and the number of spermatozoa per c.mm. of urine counted on a hæmocytometer counting chamber. The results in both cases were identical. There was no appreciable difference in spermatogenesis on the first 2 days of the injection. From the third day there occurred a rapid, and progressive fall in the sperm count. By the sixth day the spermatogenetic response of the gonadotrophins was almost absent. After a week's rest both these animals showed a revival of the normal spermatogenetic activity initiated by the gonadotrophins.

On another set of 2 animals similar experiments were done, with an interval of three days between successive injections. Neither of them showed any decline of the spermatogenetic response during the period of observation of three weeks.

Discussion

During the last 5 years animals of the *Salientia* group have been widely used for the diagnosis of pregnancy, and assay of chorionic gonadotrophins in the body fluids. The female *Xenopus Laevis*, for this purpose is the most widely quoted animal in the literature. However, the male of this species has not proved very satisfactory for the diagnosis of pregnancy, as they are very sensitive to gonadotrophins of pituitary origin (Robbins and Parker, 1949). Very few studies have been done on the Indian varieties of *Salientia*. Bhaduri (1951), who reported the results of 209 tests on *Bufo Melonostictus*, observed that the female Indian toads show no signs of ovulation when injected with chorionic gonadotrophin (Bhaduri, 1949). Our experience amply confirms this observation, and proves that female frog and toad test (the Indian species) has no place in the diagnosis of pregnancy. Nevertheless, the male Indian *Salientia*, like their South American, and European counterpart respond to injections of chorionic gonadotrophins in a very satisfactory manner, and can be fruitfully utilised for the diagnosis of pregnancy, and its disorders. Bhaduri's (1951) results on *Bufo Melonstictus* are encouraging. But, from his reports it appears that, this author has used the indigenous frogs (*Rana*) in limited manner, and tried to compute the results obtained in the latter animal against the control and standard on toads (*Bufo*). In the opinion of the authors this is not very satisfactory. The writers have compared the results on both *Bufo* and *Rana* using the same urine in identical proportionate doses in a large series of cases. They have found that the incidence of both false positive and false negative results is distinctly higher in *Bufo Melonostictus* than in *Rana Tigerina*. Moreover, the *Bufo* sometimes gives an erratic response. The same urine sometimes gives responses of different types and intensities in different animals. The mortality rate of these animals as a result of the injection of urines is higher than that in the *Rana Tigerina*. These comparative results will form the subject of a subsequent communication. The *Rana Tigerina* is however, most abundant during the monsoon only. This is a definite disadvantage. However, in a more recent communication on the subject, Mohanti and Pabrai (1950), who used the common Indian toad (*Bufo Melonostictus*) for testing 407 specimens of urine, from little over 169 subjects, claim no false positive results in a small series of cases, and no false negative results in 143 cases of pregnancy.

In the series presented here the incidence of false positive reactions was 1 in 51 cases, or 1·96 per cent. The corrected incidence of false positive results in the present series would be nil, for the only positive case was one of dysgerminoma of the ovary. These ovarian tumours have been known to give a positive Aschheim-Zondek test (Dockerty, 1950). In Bhaduri's series referred to above (Bhaduri, 1951) the incidence of false positive reactions on the toad was 4·2 per cent (3 in 71 cases).

False negative reactions in this series of 140 tests done on urine from women in the pregnant state were observed in 2 cases only (cases in labour not included), an incidence of 1·43 per cent. An accuracy of 98 to 99 per cent is the expected average from the data presented here, as well as those available in the literature, including those of Bhaduri (1951), where Indian toads were employed. This author's incidence of false negative cases is 2·86 per cent in 105 cases. It is obvious that the accuracy of the male *Salientia* test in pregnancy compares well with that of the Aschheim-Zondek test. The advantages of the former are obvious when the expense involved in the latter, and the ease of performance of the frog test are taken into account.

The false negative reactions can be minimised considerably by the concentration method described above. Brandfass and Massa (1949), Brody (1949), and Cutler (1949) also advocate concentration of gonadotrophins in the performance of frog tests. Bhaduri and Bardhan (1949) recommend an additional injection of 5 ml. of urine 3 to 4 hours after the initial injection, if the test is negative. In the experience of the authors this procedure has not yielded as satisfactory results as gonadotrophin concentration.

The results obtained in puerperium, and in abnormal pregnancy are in agreement with those of the orthodox pregnancy diagnosis tests. However, an additional advantage of the frog test in abnormal

pregnancy is the quickness with which the result is known. This will be appreciated when the positive result obtained in the case of ectopic pregnancy in this series is taken notice of. It has been demonstrated that a quantitative assay of gonadotrophins by the frog test is a simple procedure. The value of this in the diagnosis of hydatidiform mole and chorionepithelioma is obvious.

To the authors' knowledge organised pregnancy diagnosis centres do not yet exist in India. If opportunity is taken of the simplicity and inexpensiveness of the male frog test every antenatal clinic in the country could establish a pregnancy diagnosis unit. At the period when the diagnosis of pregnancy is doubtful, the test is positive in 100 per cent of cases. It has been seen that the test is positive as early as the fifth week of gestation.

Summary and Conclusions

Results of pregnancy diagnosis tests on *Rana Tigerina* in a series of 268 cases are presented. In 51 control cases agreement was 100 per cent. In 140 cases of pregnancy the incidence of accuracy was 98·57 per cent. In puerperium, and abnormal pregnancy the results were as expected. Quantitative assay of urinary gonadotrophins in obstetric conditions is a practicable and easy procedure. The Indian male frogs (*Rana Tigerina*) are suitable, and economical animals for use in pregnancy diagnosis centres.

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References

Bhaduri, J. L.—*Science and Culture*, **16**: 228, 1950.

Idem—*Proc. 38th. Indian Sci. Congress* Pt. II, p. 171, 1951

Bhaduri, J. L. and Bardhan, N. R.—*Science*, **109**: 517, 1949.

Bourg, R.—*Compt. rend. Soc. Biol.*, **103**: 916, 1930.

Brandfass, C. F. (Jr.), and Massa, E. J.—*Denison Univ Bull. J. Sci. Lab.*, **41**: 46, 1949.

Brody, H.—*Am. J. Obstet & Gynec.*, **57**: 581, 1949.

Cutler, J. N.—*J. Lab. Clin. Med.*, **34**: 554, 1949.

Dockerty, M. B.—In Meigs and Sturgis' Progress in Gynæcology, William Heinemann, London, **3**: 45, 1950.

Mainini, C. Galli.—*Sem. Med.*, **54**: 337, 1947.

Idem—*J. Clin. Endocrinol.*, **7**: 653, 1947(a).

Mohanti, J. K., and Pabrai, P. R.—*Indian M. Gaz.*, **84**: 43, 1950.

Robbins, S. L., and Parker, F. (Jr.)—*Endocrinol.*, **44**: 384, 1949.

A STUDY ON THE CIRCULATING BLOOD VOLUME UNDER ANAESTHESIA*

3. SPINAL ANAESTHESIA

PURNIMA SIRCAR (*nee* CHATTERJEE),
Calcutta

Anæsthesia induced by certain agents or techniques may cause changes in the volume of total blood plasma and cell mass. The changes may be due to a number of variable factors. Water intake and formation may be decreased particularly under deep anæsthesia. Urine formation may be depressed, fluid loss through the skin may either increase or decrease due to alteration of environmental and body temperature. Pulmonary ventilation may contribute to water loss although this accounts for only a small part of the total. The spleen may dilate or contract under influence of certain anæsthetic agents and cause alterations in cell volume. The composition of the blood may also be changed and cause variation in osmotic pressure of blood. Capillary permeability may also be changed by anoxia, or reflex stimulation. Surgery itself may also cause changes in circulating blood volume.

Only a small amount of experimental work has been done so far in order to study the effects of various anæsthetic agents on the volume of the circulating blood in the body. Ether anæsthesia in dogs have been shown to cause a decrease in plasma volume, increase in cell volume and plasma protein concentration (McAllister, 1938; Bonnycastle, 1942). In cats, however, the plasma volume was not reduced. In human beings anæsthesised with ether the plasma volume is decreased (Stuart *et al*, 1938; Gibson *et al*, 1937). Barbiturate anæsthesia is stated to cause an increase in plasma volume in cats and dogs (Bollman, 1938; Hamlin and Gregerson, 1939). In the dog, atropine has no effect on blood volume; the volume of red cells and of total blood increases with morphine. Blood volume increases with cyclopropane, nitrous oxide and oxygen and plasma volume increases with sodium pentothal (Bonnycastle, 1942; Bollman, 1938; Searles *et al*. 1936; Searles, 1938).

The flacid relaxation of the abdominal muscles and the strong intestinal contractions produced by spinal anæsthesia are of advantage in many surgical procedures. Study of the changes in blood volume under spinal anæsthesia should, therefore, be of great interest Adriani (1946) stated that there are only slight changes in the composition and volume of blood during spinal anæsthesia. Guest *et al*, (1949) studied the early effect of spinal anæsthesia in 25 patients. They found no

* The work was supported by a grant of fellowship from Indian Council of Medical Research.

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significant change in plasma, or blood volume in majority of patients receiving spinal pantocaine and ephedrine anæsthesia, with seconal, morphine and scopolamine premedication. A small percentage of their patients showed an increase in plasma and blood volume. Lawrence and Guest (1950) observed that there was no significant change in plasma and blood volume 10 minutes after anæsthesia but there was a rise one hour after anæsthesia.

In view of the scantiness of observations and the indefinite nature of findings, it was considered that a study of the blood volume changes under spinal anæsthesia would be of value. In the author's series no premedication was given to any of the patients prior to the spinal anæsthesia. This was considered essential in order to avoid the influence of drugs used for premedication on the cardiovascular system.

Spinal anæsthesia was administered with the patient in the lateral recumbent position on the operating table. The routine aseptic precautions were taken

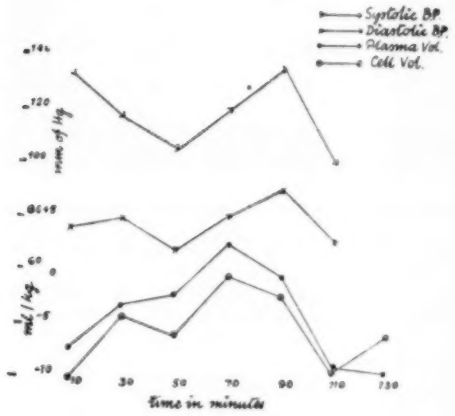

FIG. 1

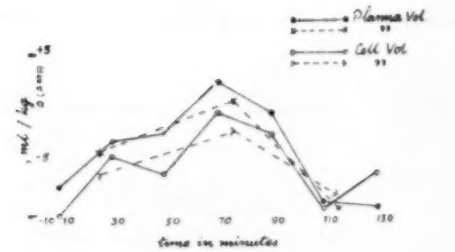

FIG. 2

for the lumbar puncture. Lumbar puncture was made through the fourth interspace and occasionaly through the third. The anæsthetic agent used in this series was 8 to 10 c.c. of Nupercaine 1/1500 in 0·5 per cent saline according to the height and weight of the patient and the site of operation. The amount used in most of the cases was 10 c.c. All the patients had ¼ gr. ephedrin intramuscularly just after the spinal anæsthesia. The sensory level of skin anæsthesia was not above the umbilicus (10th thoracic) in any of the cases.

Blood volume estimations were performed half to one hour before anæsthesia and again during anæsthesia. The technique of estimation has already been described (Chatterjee, 1952a).

A second estimation of blood volume was made during the course of spinal anæsthesia at intervals of time varying from 17 to 130 minutes. Records of the blood pressure and pulse were carefully kept.

The results of the control series have been already reported to establish the validity of repeated determinations of blood volume by Evans blue method (Chatterjee, 1952b).

This series consists of 21 cases, comprising of the following operations under spinal anæsthesia; herniorrhaphy (10), block dissection for inguinal glands (2), fistulectomy (1), hydrocele (2), reconstruction of urethra (1). The patients were all males and between 20 to 50 years of age. No intravenous transfusion of fluid was necessary in any of the cases and the blood loss was minimal.

RESULTS

The results of the twenty-one cases are given in Table 1. The absolute value for the plasma volume and total cell mass obtained from the initial and subsequent determinations along with the differences between the two are also tabulated in it. The difference is expressed in ml. of plasma lost or gained per Kg.

The relationship of the change in plasma volume with the course of anæsthesia is shown in the graphs (Figs. 1 and 2) constructed with the means of the changes of plasma volume against the time in minutes. These graphs present a regular curve. The curve can be divided into three phases (Fig. 2), the first or the initial phase of depression, a middle phase of elevation or compensation, and the last phase of decompensation. In the first phase from 0 to 45 minutes the plasma volume shows an average reduction of −4·12 ml./kg., the maximum being −8 ml./kg. In the second phase from 45 to 95 minutes the average difference is +0·427 ml./kg. In the last phase *i.e.*, beyond 95 minutes the average value is −9·21 ml./kg. The changes in the plasma volume are statistically significant for the first and last phases (Tables 2 and 3b). Similarly, values of cell volume in the first phase shows an average reduction of −6·21 ml./kg. In the second phase −2·18 ml./kg. and in the last phase −8·33 ml./kg. Of these three values of cell volume the reduction in

TABLE I

No.	Sub. No.	Body Wt. in Kg.	C.V.%	P.V.	Diff. of P.V.	Diff./ Kg.	C.V.	Diff. of C.V.	Diff./ Kg.	Time in min.	Operation
1.	123	69	44·2	2904	−568	− 8·23	2300	−726	−10·5	17	Hernia.
			38·7	2336			1574				
2.	120	60	46·8	2860	−422	− 7·03	2722	−586	− 9·7	20	Hernia.
			66·7	2438			2136				
3.	153	62·7	46.0	2500	−353	− 5·62	2129	−187	− 2·98	25	Hernia.
			47·5	2147			1942				
4.	76	47·7	45·4	2500	−403	− 8·4	4578	−766	−16·0	30	Fistula in ano.
			45·0	2097			3812				
5.	129	61·8	41·3	2195	− 46	− 0·75	1544	− 70	− 1·1	30	Block resection inguinal glands.
			40·7	2149			1474				
6.	114	59	40·5	2676	−401	− 6·79	1821	−221	− 3·7	40	Hernia.
			41·3	2275			1600				
7.	116	50·9	48·5	2340	−267	− 5·24	2223	−769	−15·1	40	Hernia.
			40·1	2073			1454				
8.	140	50	44·5	2216	+ 38	+ 0·78	1776	− 66	− 1·3	40	Hernia.
			43·2	2254			1710				
9.	144	70	44·8	2323	+102	+ 1·45	1885	+ 99	+ 1·41	40	Hydrocele.
			45	2425			1984				
10.	111	78·1	51·7	2500	+ 87	+ 1·11	2675	−526	− 6·7	45	Reconstruction of urethra.
			44·2	2587			2149				
11.	133	62·7	48	2689	−439	− 7	2482	−714	−11·3	45	Hydrocele.
			44	2250			1768				
12.	11	50·9	35	2540	+ 47	+ 0·92	1367	− 30	− 0·5	50	Block dissection inguinal glands
			34·1	2587			1317				
13.	123	69	44·2	2904	−110	− 1·59	2300	−476	− 6·9	50	Hernia.
			39·5	2794			1824				
14.	83	43·6	41·4	2293	+ 55	+ 1·26	1629	−251	− 5·7	70	Hernia.
			37·0	2348			1378				
15.	129	61·8	41·3	2195	+198	+ 3·20	1544	+306	+ 4·9	80	Hernia.
			43·6	2393			1850				
16.	114	59	40·5	2676	−105	− 1·77	1821	−205	− 3·4	85	Hernia.
			38·6	2571			1616				
17.	111	78·1	51·7	2500	−123	− 1·57	2675	−508	− 6·5	88	Reconstruction of urethra.
			47·7	2377			2167				
18.	131	71·7	49·4	2123	+113	+ 1·51	2074	+160	+ 2·2	95	Hernia.
			50	2236			2234				
19.	153	62·7	46	2500	−393	− 6·26	2129	−771	−12·2	100	Hernia.
			39·2	2107			1358				
20.	88	50	36·1	3148	−591	−11·8	1778	−321	− 6·4	105	Hernia.
			36·3	2557			1457				
21.	71	47·7	35	2840	−455	− 9·76	2065	−295	− 6·18	130	Block dissection inguinal glands.
			42·1	2385			1770				

TABLE 2—TEST OF SIGNIFICANCE OF MEAN OF EACH GROUP

		Time in minutes	Mean	Sd. error	Diff	"T"	5% "T"	Remark
Plasma Volume	Gr. I	0-45	−4·12	1·20	10	3·43	2·228	"S"
	Gr. II	45-95	+0·427	0·697	6	0·613	2·447	not "S"
	Gr. III	beyond 95	−9·29	1·780	2	5·21	4·303	"S"
Total Cell Mass	Gr. I	0-45	−6·21	1·51	10	4·11	2·228	"S"
	Gr. II	45-95	−2·18	1·75	6	1·24	2·447	not "S"
	Gr. III	beyond 95	−8·33	1·976	2	4·215	4·303	not "S"

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the first phase is statistically significant (Tables 2 and 4 b). An attempt is made to describe the change of plasma volume with time by some mathematical relation in so far as the regularity of the curve is concerned,

TABLE 3a—FREQUENCY TABLE OF PLASMA VOLUME BETWEEN TIME INTERVAL

	10	30	50	70	90	110	130	*Total*
−10	...	...	...	...	...	1	1	2
− 8	2	1	1	...	...	...	...	4
− 6	...	3	...	...	...	1	...	4
− 4	...	...	...	...	...	...	...	...
− 2	...	...	1	...	2	...	...	3
− 0	...	3	2	1	...	...	...	6
+ 2	...	...	...	1	1	...	...	2
Total	2	7	4	2	3	2	1	...

TABLE 3b—TEST OF SIGNIFICANCE BETWEEN THE MEANS OF THE GROUPS OF PLASMA VOLUME

Group A—0.45 min., Group B—45-95 min., Group C—beyond 95 min.

Groups	*Means*	*Diff. in mean*	*Sd. error*	*Df.*	*"t"*	5% *"t"*	*Remark*
A & B	−4·12 +0·427	+4·547	1·206	16	3·77	2·12	"S"
A & C	−4·12 −9·29	+5·17	2·457	12	2·10	2·179	not "S"
B & C	+0·427 −9·29	−9·717	1·410	8	6·58	2·306	"S"

TABLE 3c—ANALYSIS OF VARIANCE TABLE OF PLASMA VOLUME

Source of Variation	*Df.*	*S.S.*	*M.S.*	*Obsed. "t"*	5% *"t"*	*Remark*
Between ...	6	1·5364	0·2561	4·525	2·85	"S"
Within (error)	14	0·7921	0·0565	...	...	
Total ...	20	2·3185	...	...	...	
Regression ...	2	1·3162	...	...	...	
Deviation from Equation (1)	4	0·2202	0·05505	0·973	3·11	not "S"

The equation:—$Y = 1{\cdot}542 \times e^{0{\cdot}06257 x - 0{\cdot}0051 x^2}$ .....(1)

where Y is the change in plasma volume
and X is the time interval

is fitted to, the data by means of list square method. The following comparison between the values of Y in the equation (1) and in the observed shows that the change in plasma volume with time most closely obeys the above mathematical equation.

Time	*Observed Y*	*Equation Y*
10	3	2·8
30	7·2	6·4
50	8·5	9·8
70	12·0	10·2
90	10·3	6·7
110	3·0	3·2
130	1·0	1·0

With reference to the table of analysis of variance (Table 3a) the significant "between variance" (Table 3c) shows the change of plasma volume between the time groups. Further the variance due to the deviation from the equation (1) is found not significant. This stabilises the validity of the equation (1).

TABLE 4a—FREQUENCY TABLE OF TOTAL CELL MASS BETWEEN TIME INTERVAL

	10	*30*	*50*	*70*	*90*	*110*	*130*	*Total*
−16	...	1	...	...	...	...	...	1
−14	...	...	...	...	...	...	...	...
−12	...	...	1	...	...	1	...	2
−10	2	...	...	...	...	...	...	2
− 8	...	1	...	...	...	...	...	1
− 6	...	...	2	1	1	1	1	6
− 4	...	1	...	...	1	...	...	2
− 2	...	3	...	...	...	...	...	3
0	...	...	1	...	...	...	...	1
+ 2	...	1	...	...	1	...	...	2
+ 4	...	...	...	1	...	...	...	1
Total	2	7	4	2	3	2	1	...

TABLE 4b—TEST OF SIGNIFICANCE BETWEEN THE MEANS OF THE GROUPS OF CELL MASS

Group A—0.45 min., Group B—45-95 min., Group C—beyond 95 min.

Group	*Mean*	*Diff. in mean*	*Sd. error*	*Df.*	*"t"*	5% *"t"*	*Remark*
A & B	−6·21 −2·18	−4·03	1·80	16	2·33	2·12	"S"
A & C	−6·21 −8·33	+2·12	3·168	12	2·003	2·17	not "S"
B & C	−2·18 −8·33	−6·15	3·069	8	0·6691	2·306	not "S"

Similar statistical analysis was carried out with total cell mass referring to the table of analysis of variance of total cell mass (Tables 4a and 4c). The "between variance" is found not significant which shows that there is no significant change of total cell mass between the time groups. The failure may be accounted to the high order of error variance. For the given data total cell volume presents high order ot variance. Thus the total cell mass between the time groups do not present any regular relationship.

TABLE 4c—ANALYSIS OF VARIANCE TABLE OF TOTAL CELL MASS

Source of variation	*Df.*	*S.S.*	*Mean Sq.*	*Obsd. "t"*	*5% "T"*	*Remark*
Between groups	6	136·19	22·69	<1	2·85	not "S"
Within group (Error) ...	14	380·38	27·17	...	...	
Total ...	20	516·57	...	...	...	

From the statistical point of view the cell mass remains at the null point *viz.*, maintained in the resting level throughout the course of anæsthesia. The analysis of the blood pressure with plasma volume and tota' cell volume (Table 5) shows that plasma volume bears a direct relation with systolic blood pressure. The correlation is +0·0801 which is significant and appreciably high.

TABLE 5.—ANALYSIS OF VARIANCES BETWEEN BLOOD PRESSURE AND PLASMA AND CELL VOLUME

Variants	*B. P.*	*r*	*Sd Error*	*"T"*	*Df.*	*Remark*
Plasma Volume	S	+0·801	0·0957	8·36	16	"S"
	D	−0·087	0·265	0·33	,,	not "S"
Total Cell mass	S	+5·437	7·633	0·71	,,	not "S"
	D	+6·116	9·729	0·628	,,	not "S"

DISCUSSION

The changes in plasma volume which occurred in the present series of cases have been observed to follow three phases. The first phase, which lasts for about 45 minutes, from the time of induction of anæsthesia is characterised by a reduction in the volume of plasma. Statistical analysis of the data has shown that this depreciation is significant. Comparison of the blood pressure studies and changes in plasma volume indicate that the fall in plasma volume precedes the fall of arterial tension. In fact, in the series of cases presented here hypotension in the initial phase was not a marked feature. The second phase, between 45 and 95 minutes is characterised by a restoration of the plasma volume to almost a normal level. Compared with the depreciation in the first phase this change indicates statistical significance. Blood pressure at this stage is slightly raised. In the last phase, which is beyond 95 minutes of anæsthesia, there is again a fall of plasma volume, which is even greater than the initial fall observed at the first phase. This depreciation shows statistical significance both gross and when compared with the restoration which occurs in the second phase. This is accompanied by a marked fall of blood pressure.

In the present state of our knowledge it is difficult to find adequate explanation for the changes in plasma volume described above. Fall of blood pressure is a common bugbear in the initial stages of spinal anæsthesia. Several theories have been offered for this: Pooling of blood in the splanchnic area (Porter *et al* 1951, Labaty 1930), dilatation of blood vessels and muscular relaxation in the extremities (Grey and Parson, 1912), blocking of white rami of the spinal nerves (Ferguson and North, 1932), diminished secretion of adrenalin due to absence of stimulation of the gland (Pitkin, 1940). None of these theories would provide a satisfactory explanation for the reduction in plasma volume. Blumer and Sullivan (1947) pointed out that nupercaine in low concentration causes capillary dilatation. This would cause a segregation of blood in the capillary bed the effect of which would be a reduction of the estimable volume of circulating plasma. It is of interest to note here that neither Adriani (1946) nor Lawrence and co-workers (1950) found any significant alteration in plasma volume after using pantocain as spinal anæsthetic. It is possible to explain the divergence of findings between the present study and those of the workers just quoted by the property of the spinal anæsthetic used. The restoration in the second phase is obviously a compensatory mechanism which is also shown by the response of the blood pressure at this stage. The exact nature of the compensatory mechanism involved in this process is not known yet. The third phase is one of decompensation. This failure of compensation is not due to loss of blood involved in the surgical operations. The average blood loss in the series was only 0·737 ml. per kg. of body weight and this amount is too small to explain the changes in the plasma volume observed. Studies of venous pressure, oxygen carrying capacity of the blood, plasma adrenaline level and capillary permeability may be expected to provide an answer to this.

SUMMARY

1. Blood volume estimation by Evans blue method was made in 21 cases operated under spinal anæsthesia; the determinations were made—one before the anæsthesia and the others at intervals of time varying from 17 to 130 minutes.

2. The total cell mass does not significantly alter with the time of anæsthesia but the plasma volume presents a regular log parabolic curve with an initial depression, middle elevation upto the resting level and last a final phase of decompensation at 45, 95 and beyond 95 minutes of anæsthesia. The mean values show significant difference between groups.

3. The systolic blood pressure is directly related to the change of plasma volume. The co-efficient of correlations of high magnitude and significant.

This study is an humble attempt to emphasise the possibilities and potentiality of a vast field of untrodden knowledge yet to be found out and utilised in every day practice.

ACKNOWLEDGMENT

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REFERENCES

ADRIANI—The Chemistry of Anæsthesia, Springfield, Illinois Charles O. Thomas 1946 p. 333.

BOLLMAN, J. L. *et al.—Surgery*, **4**: 881-886, 1938.

BLUMER, G. AND SULLIVON, A. J.—The Therapeutics of Internal Disease. Wilcox & Follett Co., Chicago New York 1947 p. 160.

BONNYCASTLE, D. D.—*J. Pharm. & Exper. Therap.*, **75**: 18-29, 1942.

CHATTERJEE, P.—*J. Indian M. A.*, **21**: 231-238, 1952 a.

CHATTERJEE, P.—*J. Indian M. A.*, **21**: 284, 1952 b.

CONLEY, C. L.—*Am. J. Physiol.*, **132**: 796-800 1941.

FERGUSON, L. K. *et al.—Surg. Gynec. & Obstet.*, **54**: 621, 1932.

GIBSON, J. H. *et al.—Surg. Gynec. & Obst.*, **63**: 741-747, 1937.

GREGERSON, M. I.—*J. Lab. & Clin. Med.*, **29**: 1266, 1944.

GREY, H. T. AND PARSON, L.—*Quart. J. Med.*, **5**: 339, 1912

GUEST, S. I. *et al.—Anæsthesiology*, **10**: 289-294, 1949.

HAMLIN, E. AND GREGERSON, M. I.—*Am. J. Physiol.*, **125**: 713-721, 1939.

LABAT, G.—*Surg. Clin., N. America*, **10**: 671, 1930.

LAWRENCE, S. M. AND GUEST, S. I.—*Am. J. Physiol.*, **161**: 239, 1950.

MCALLISTER, F. F.—*Am. J. Physiol.*, **124**: 391, 1938.

PITKIN, G. P.—*Anæsthesia & Analgesia*, **8**: 78, 1940.

PORTER, W. T. *et al.—Am. J. Physiol.*, **38**: 108, 1915.

SEARLES, P. W.—*Am. J. Surg.*, **41**: 399-404, 1938.

SEARLES, P. W. *et al.—Proc. Staff Meet. Mayo Clin.*, **11**: 481-483, 1936.

STEWART, J. D., *et al.—J. Clin. Invest.*, 171 : 413-416, 1938

PRACTITIONERS' CORNER

EARLY DETECTION OF CARCINOMA OF THE LOWER GENITAL TRACT IN FEMALES*

TARIT KUMAR GHOSH, B.SC., M.B. (CAL.), L.R.C.S. (EDIN.), L.R.F.P. & S. (GLAS.), M.R.C.P. (ED.), D.G.O., L.M. (DUB.),

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The importance of the early diagnosis of carcinoma of the lower genital tract in females and its prevention has been well-emphasized in recent years. The reason for this is that once cancer has developed, it is a progressive condition, and that in its process of extension it causes much agony and pain, distressing hæmorrhage and disability. As yet, definite knowledge of the ætiology and successful remedy of this condition is lacking. However, the relieving features are that in its earliest stage it remains localised to the particular organ for a length of time which may be over a year and that if treatment is adopted at this stage, with the methods at our disposal, the patient may be saved the agony which invariably follows if the condition is allowed to progress untreated. Statistics show that about 70 to 75 per cent of the cases in the early stage can be cured.

*Read at the South Calcutta Doctors' Club in June, 1951.

CARCINOMA OF THE CERVIX

The commonest site of cancer of the cervix is the area where the columnar epithelium which lines the endocervix is continuous with the squamous epithelial covering of the portio vaginalis cervicis. The early diagnosis of cancer cervix is of great importance, but until recently tissue friability and bleeding have been the principal criteria for the diagnosis of the earliest recognisable stage. A case of very early carcinoma, before friability became evident, has, therefore, been diagnosed only on rare occasions.

The difficulty for early diagnosis is that an early malignant growth of the cervix gives rise to practically no symptoms or causes such minor deviations from normality that the patients take the symptoms casually, especially at the age when cancer is common. The symptoms are (*i*) irregular vaginal bleeding which may be profuse or slight, (*ii*) vaginal discharge either profuse or offensive and (*iii*) pain at the small of the back If the history is carefully taken and the patient is intelligent enough, one can elicit the history of spotting or contact bleeding, and a slight leucorrhœa off and on for some time. Usually these early symptoms are so insignificant that they are ignored until bleeding becomes severe and persistent, the leucorrhœa offensive or pain sets in. But these are late symptoms, especially pain, and in presence of these the cancer will be found to have extended beyond the definition of an early case. In an exceptional case pain may be an early symptom, and recently this led me to detect two cases of early carcinoma. However, pain in these cases is not a symptom of an early carcinoma but of a condition which is often a precursor of malignancy. This will be presently described. Thus, the first step in the diagnosis of early cancer is a careful investigation of the patient when these symptoms are presented.

An important feature in this is the recognition of the cancer age, which is between 40 and 50 years, *i.e.*, the menopausal age. However, it must not be forgotten that no age in the reproductive period is immune from this condition. Any vaginal bleeding or abnormal discharge in the post-menopausal age is extremely suspicious of malignancy. Although cancer cervix is common in parous and multiparous women, even virgins have been known to develop cervical carcinoma. In taking the history, apart from elucidation of

symptoms, the family history of malignancy should also be inquired into. Local examination of the patient is the only means of diagnosing cancer. The vulva should be inspected in good light. Then a bimanual examination made. After examining the vaginal walls, the cervix should be carefully palpated. The contour of the cervix should be felt first and any irregularity on the surface noted. One may find the cervix quite normal or there may be a small growth or ulcer. It may be that there is nothing except that the cervix is bulky or expanded beyond the external os or it may feel nodular. A smooth surface of the cervix does not exclude malignancy. The cervix is felt gently, carefully and around the os. It may have a normal feel or the feel may be irregular, soft in some places and harder at others.

In more advanced cases, a big growth of a proliferative cauliflower or nodular type or ulcerative type may be felt, and these are obvious lesions and when found the growth is often not an early one.

After the cervix is felt the size, position and mobility of the uterus are determined. The presence of any blood on the examining finger and vaginal bleeding after the digital examination are noted. The cervix is then inspected in good light with the help of a speculum. There is no gross lesion on the cervix which can be described as typical of early carcinoma. Different early appearances of the cervix have been described, which are prone to be malignant. One may find a slightly elevated superficial layer, *i.e.*, heaving of epithelium. In other cases there may be a dull, somewhat wrinkled surface, which may easily be overlooked unless very carefully inspected. There may be a dark purple coloured small rounded area, just at the junction of the squamous and columnar epithelia or a less transparent lighter coloured surface.

Whitish patches have been described which are known as leukoplakia, but to the unaided eyes it is often extremely difficult to detect. This can be seen with the help of a lens or with a colposcope, but the latter is not an easily accessible instrument. Another test that was once much popular and is still sometimes talked about is Schiller's iodine test. This consists of painting the cervix with Lugol's or Gram's iodine solution and then viewing it in a good light. It is found in some cases that certain areas do not take the iodine stain and it was thought that those areas were malignant, but it is now known that various other causes like infection or Naboth's follicle also gives rise to a similar appearance. The test is not diagnostic, but certainly is helpful, for it points out the abnormal areas on the cervix, which may require further examinations by other means. Another finding is an erosion of the cervix. Erosion by itself is not a malignant lesion, but if an erosion, either big or small, whether it is all round the os or on only a small part of a lip of the cervix, bleeds readily to touch during examination, or during swabbing it with dry gauze, malignancy should be suspected. Again, if an erosion persists after proper cauterisation, however small the area may be, the possibility of a malignant change must be considered.

Occasionally, there may be small ulcers in the cervix or small warty growths around the external os The margins are harder in feel. They often bleed to touch and at times these warts peel off on the examining finger. These are very suggestive of malignant lesion.

After making the examination, if any of the aforementioned conditions are found, the patient should be immediately warned, and the importance of immediate necessary confirmatory examination must be stressed. To "wait, watch and see" is the most dangerous practice.

During the last few years, vast literature has accumulated regarding vaginal smear examination. It was first described in 1929 by Papanicolau, that carcinomas exfoliate cancer cells into the vagina before they produce symptoms recognisable as those relating to a cervical neoplasm. Since then the work of Papanicolau and more recently that of Ayre and others have received much attention as a diagnostic method and an accuracy approaching 95 per cent is claimed. Several Indian workers, including ourselves have employed this technique in the diagnosis of cancer. But the services of an expert cytologist are indispensable in the interpretation of the smear, and then the opinion is not always unanimous.

Cervical biopsy is a more important method of diagnosis. Biopsy may be taken in a variety of ways. The easiest means is to take a small piece from the margin of the lesion with a scalpel taking care that both the affected and a small portion of the unaffected areas are included. If properly taken, one should not be afraid of bleeding because this bleeding can be effectively checked with a small plug of cotton or gauze which is kept inside for sometime and the patient is advised to take it out herself after about twelve hours. Examination of this material will in all cases confirm the diagnosis. In an exceptional instance the opinion may be doubtful, but such cases are rare. Other more elaborate methods of cervical biopsy have been described, but they are not always available to a general practitioner.

Prevention of Carcinoma of the cervix: This is very difficult but is of extreme importance. This is possible if proper clinics are organised and patients are made to realise the importance of the periodic check up. Recently this type of work has been done with the help of cytological examination and in 2 per cent, carcinoma of the cervix has been found in otherwise healthy women with no symptoms. But this method is not practicable at present in our country, for obvious reasons.

Certain conditions do precede cancer or give rise to it. It is now fairly well established that the develop

ment of cancer in cervix is favoured by long continued irritation and infection *i.e.*, the form of chronic cervicitis which generally results after laceration, eversion, erosion, cystic changes or formation of polypi. When detected they should be cauterised or otherwise proper treatment instituted. Palliative measures for these conditions like douching etc., are dangerous, it is extremely easy to miss an early cancer if these lesions are neglected. It is equally easy to beguile the patients with a placebo until cancer develops and spreads beyond hopes of complete recovery.

Carcinoma of the Vagina

Primary cancer of vagina is extremely rare. When it begins, its symptoms are more of the nature of cervical cancer, but pain is often present early. Majority of this cancer starts in the upper third. More commonly a cancerous growth in the vagina is secondary to a carcinoma of the upper genital tract.

Carcinoma of the Vulva

Though the incidence of vulval cancer is fourth in the order of genital malignancy in the female, it is perhaps the most badly diagnosed and poorly treated condition among the whole series of malignant lesions. Nevertheless, it is one of the conditions in which the disease can be diagnosed very early and with proper treatment a very encouraging result is obtained. The disease metastasises freely like the lesions elsewhere in the genital tract owing to the free and profuse interlacing lymphatic drainage. The first group of nodes that are affected are the inguinal glands. But the peculiarity is that the disease remains localised to these adjacent regional nodes with very infrequent extension to distant organs and hence the chances of cure are favourable.

The disease is common between 60 and 70 years of age and at this age patients are rather reluctant to consult a doctor for what appears to be an apparently trivial lesion of the genital tract. So, for a long time the early lesions are often treated as ordinary skin conditions or as innocuous sores which occur generally due to scratching or so. As time passes these ulcers gradually increase in size and become offensive failing to respond to ordinary treatment. But then it is probably too late for treatment.

The object should always be to detect the cause underlying the symptoms complained of in these women rather than to prescribe palliative remedies. Cancer of the vulva is frequently associated with the pruritus and pain.

So whenever a patient, specially a post-menopausal subject complains of symptoms, an examination should be demanded. Pruritus may be due to various causes, but cancer should be excluded first. In order to do this the sites of carcinoma in the vulva should be remembered. These are:—(*a*) The labial, perineal and preputial skin; (*b*) the clitoris, either from beneath the surface of skin in the epithelium of glans itself; (*c*) it may start from the vestibule or beneath the urinary meatus. and (*d*) it may start from Bartholin's gland.

If a patient complains of pruritus, search should be made for any ulcer or a nodule in any of these regions of the vulva. If these two lesions co-exist, the condition is most probably malignant. If dysuria is present, it is always wise to inspect the meatus and the vestibule. An ulcer may be found just under the meatus, or a small cherry-red growth looking like a caruncle may be seen. A biopsy is indicated in these cases. A not uncommon finding is swelling of the vulva with or without pain or pruritus and having an appearance similar to that of a lymphogranuloma. If neglected, they break down to an ulcer and then the malignant nature is revealed. In fact, a painful swelling or an ulcer at this age, if this does not prove to be an abscess, must arouse suspicion of malignancy.

On this subject, the importance of leukoplakia comes to the forefront. I do not desire to go into the details of the condition, but I want to emphasise this much that cancer of the vulva is very often preceded by leucoplakia. It is important to remember this in connection with prevention of vulval carcinoma. The importance of treating this condition before malignancy sets in cannot be over-emphasized.

Syphilitic lesions of vulva particularly tertiary lesions are often the starting point of malignant ulcers. So a positive serological test for syphilis does not negative malignancy. Here is the importance of immediate treatment and adequate follow-up where tissue biopsy is not possible.

A senile wart specially if it is subject to trauma must be removed.

A Bartholin's cyst in a woman of 40 or 50 should be closely watched and removed, as malignant change is likely to develop in it.

A SIMPLE METHOD OF WEIGHING SERIOUSLY ILL PATIENTS

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AND

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In the course of our investigations on the changes in the body fluids of cholera it was found necessary to estimate the blood volume by the dye method and also to determine the total thiocyanate space. It was not possible, however, in the initial stages to correlate the blood volume with the exact weight of the patient as it was not possible to weigh them in such a seriously ill state. We had to rely on the weight of the patients when they were convalescent and deduce the blood and interstitial fluid volume per kilogram from this weight. Obvously such a method was only approximately correct, and in those instances where the patients died, valuable data could not be correlated. However it has now been possible for us to weigh such

seriously ill cholera cases by a simple method which is described below.

METHOD

Two portable weighing machines are placed at a distance of 10 feet approximately and the stretcher bearers carrying the patient on the stretcher, or on an invalid chair stand on the portable weighing machines as illustrated in Fig. 1 (a and b). The reading record-

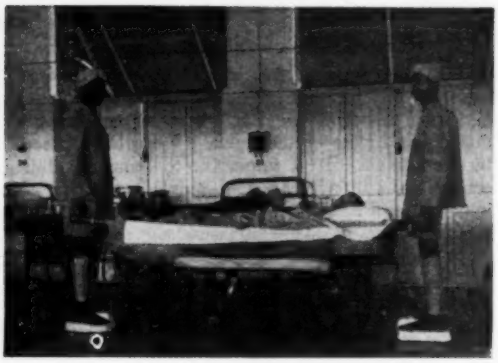

FIG. 1a

ing the weights on the two machines are added and this gives the weight of the stretcher-bearers, the stretcher or invalid chairs as the case may be and the

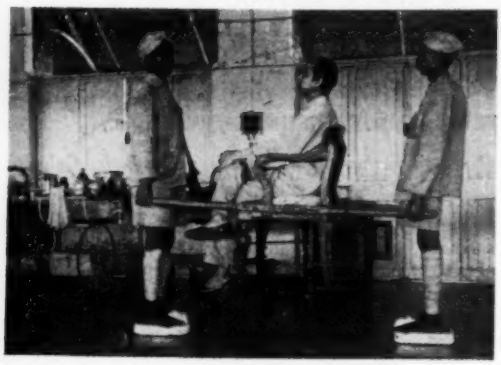

FIG. 1b

patient (W_1). The patient is then put on the bed and the procedure is repeated with the two stretcher-bearers and the empty stretcher (or invalid chair) with the patients garments as illustrated in Fig. 2 (a and b). The sum of the weights now recorded on the two machines gives the weight of the stretcher-bearers, the patients garments, and the empty stretcher or invalid

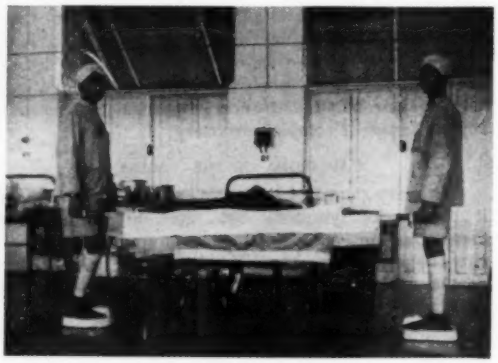

FIG. 2a

chair (W_2). Obviously, the difference between the two weights (W_1—W_2) is the weight of the patient.

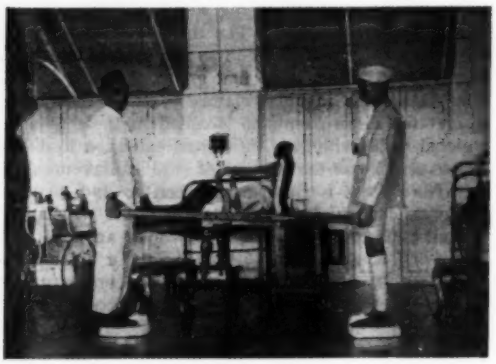

FIG. 2b

We have made observations in a large number of cases by actualy weighing persons by the ordinary method and by the procedure described above, and find this method to be accurate.

There are many instances where for purposes of investigation it may be necessary to estimate the volume of body fluids in seriously ill cases. One of the preliminaries of such investigation is to find out the weight of the patient. If this is taken later the correlation between the blood volume may not be accurate specially in states of dehydration and œdema. Such estimations may be necessary in cases of congestive cardiac failure, acute nephritis, eclampsia, shock, cholera etc., and there may be instances in which the

patient is even unable to sit up, or is unconscious. We found this method accurate and useful and it has the advantage of extreme simplicity. The patient is weighed in the stretcher or chair that brings him into the hospital.

The procedure may be utilised to weigh any seriously ill patient when his weight is likely to be useful for purposes of diagnosis, prognosis or treatment or is essential for special investigations.

We are encouraged to publish the method because it appears much simpler and more universally applicable than a method recently published by Bedford (1951).

REFERENCE

BEDFORD, P. D.—*Lancet*, 2: 971, 1951.

SPECIAL ARTICLES

TRENDS IN ANTIBIOTICS*

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It is but fair to say that as antibiotics are conquering fresh domains of infections, they are also surrendering their early conquests. In the grim fight between disease-producing organisms and antibiotics the organisms are proving a match and the unwelcome fact has to be faced ere long. Where one antibiotic fails, another takes its place successfully, so far. All rickettsial diseases are susceptible to one or other of the antibiotics. Some though not all viral diseases are successfully treated to-day. Mycotic infections in the main are resisting antibiotics for "they are all of the same clan." Antibiotics as a class are of low toxicity except streptomycin and gramicidin-tyrothricine group; the latter fortunately of limited use. Low toxicity is not to be taken for atoxicity, for each antibiotic shows a few side actions that are undesirable and it is good to be alive to these. Some of the minor toxic manifestations may not preclude continuance of some antibiotic, while others may demand temporary discontinuance.

PENICILLIN

The mode of action of sulphonamides is established, but the way in which penicillin acts is still speculative. So far as we know, penicillin acts possibly (1) by inhibition of nucleotide metabolism; either it acts by inhibiting alkaline phosphatase which acts as a catalase in mononucleotide metabolism or inhibition of synthesis of phosphoric ester necessary for bacterial growth or (2) by acting as a competitor for glutathione necessary for growth and multiplication of some organisms or (3) by its affinity for the sulphydril group of bacterial enzyme system.

Our interest however centres round other aspects of penicillin.

Prolonging Penicillin Action—It is useful to remember the gradations in blood concentration of the various penicillin compounds in use. At least four deserve mention: (1) There is the old aqueous solution of the salt potassium or calcium, an intramuscular injection of which is absorbed quickly and maintains blood concentration for about 2-3 hours, thereby necessitating three or four hourly injections. (2) There is the penicillin in oil compound where a single intramuscular injecton of 150,000 units may maintain blood concentration for 12-18 hours (3) Next there is the procaine penicillin in oil, a suspension in cotton seed oil or oil of sesame (without beeswax) which may maintain blood concentration for 36-48 hours and (4) lastly, there is procaine penicillin in oil with aluminium monostearate where a single dose of 300,000 units I.M. may maintain blood concentration for about 72 hours.

Several questions are to be faced at this stage. What is the therapeutic active level of penicillin: is that level constant for all infections: what happens it the level is raised much higher: should that level be maintained for an optimum period or can there be interruptions in this level? These and similar questions have to be met though no categorical answer is possible for each.

(1) WHAT IS THE THERAPEUTIC ACTIVE LEVEL?—Here an important note of warning is imperative. Blood level, high or low, is not often identical with therapeutic active level. Blood level is not always a guide to treatment with penicillin except perhaps for serious cases of septicæmias. Other important considerations seem to be, tissue depots, susceptibility of organisms, bacterial recovery period etc. Storage of penicillin varies with tissues, long after penicillin has disappeared from blood, it may be stored in some remote tissue where it is wanted. Some organisms are readily susceptible, while others like the treponema are resistant and tend to recover from the first attack. It used to be said that a blood level of 0·05 to 0·2 units per c.c. should be adequate for all infections including treponema pallida. Confirmation of the wastefulness of large doses as also the futility of small but too frequent doses is obtained from the works of Eagle (1949) who treated experimental syphilis in rabbits by different schemes, such as large single doses, moderately large infrequent dosage, small frequent dosage and very small and very frequent dosage. The conclusions are: "The common practice of dividing the total daily amount of penicillin into frequently injected doses may be an inefficient means of therapy as against a few large doses a day. Doses that are too large may be just as wasteful as those which are too small and

* The paper formed a part of a post-graduate lecture to the University of Madras.

frequent. Length of action at relatively low concentrations, provided it is in therapeutic range, is better than multiple peaks, much higher than therapeutic range."

(2) IS THE BLOOD LEVEL CONSTANT FOR ALL INFECTIONS?—A categorical answer is possible here; blood level is not only NOT constant for all infections, but even for the same infection, it may not be constant. As already observed, a blood concentration level may be constant for septicæmias, subacute bacterial endocarditis etc., but not for all clinical conditions. The reason for this leads to consideration of an important aspect in drug treatment. Tissue fluid concentration is very different from blood concentration. In localised disease, localised tissue concentration is of greater importance than blood level. It has been shown in dogs that a titrable level of penicillin persists in lymph considerably longer than in blood. When tissues are damaged experimentally, say by injecting turpentine, a greater concentration of penicillin is noticed in the damaged tissue. Similarly in a diseased organ a greater concentration of penicillin, and that for a longer time is noticed. This is in accordance with the requirements of an ideal chemotherapeutic agent as envisaged by Paul Ehrlich as a chemotherapeutic agent should have a focal or magic bullet action going straight to its target in preference to other tissue not diseased.

(3) WHAT HAPPENS IF BLOOD LEVEL IS MUCH HIGHER THAN IS NECESSARY?—As much as 0·5 units per c.c. of penicillin for 7-10 days continuously did not do any harm or damage the host. Herein lies the superiority of penicillin over sulpha compounds. Penicillin again satisfied the requirements of an ideal chemotherapeutic agent in having a maximum therapeutic index or wide margin of safety with maximum parasitotropic and minimum organotropic action. But this very fact enjoys an important note of warning. Apart from its physiological inertness tempting medical men to indulge in wasteful extravagance, newer data seem to preclude higher blood level. Increasing the concentration of penicillin above therapeutic necessity is not merely wasteful (the older view ' the higher the blood concentration the better the effect' is no longer valid) but high concentration may even impede the healing process by not having bactericidal effect (*vide* intra-antibiotic synergism and antagonism).

(4) SHOULD BLOOD LEVEL OF PENICILLIN BE MAINTAINED AT AN OPTIMUM LEVEL FOR A REQUIRED PERIOD OR COULD IT BE INTERRUPTED?—This has been answered in conflicting ways. From what has been said, it will be seen that except for blood infections and subacute bacterial endocarditis, blood concentration alone is not the determining factor. In organic or localised infections, tissue concentration is the determining factor. Tissue concentration sometimes may be three times as much as blood, for three times as long a period after one injection. It is therefore possible to raise tissue concentration, the diseased tissue in particular, to a desired level, independent of duration of blood level. And therefore it is possible to treat many clinical conditions by intermittent treatment, not ensuring a constant blood level for a definite period. The exception to this is possibly cerebrospinal infections where such a high concentration as in other tissues may not be possible.

And thus we are led to two important clinical uses of antibiotics since 1948 *i.e.*, trends towards discontinuous instead of continuous therapy and trends towards multiple or plyantibiotic therapy. Clinically discontinuous therapy has been tried in many conditions with results comparable or superior to continuous therapy by the tick of the clock.

(5) DISCONTINUOUS VERSUS CONTINUOUS THERAPY WITH ANTIBIOTICS.—In the light of previous experience with sulpha drugs and many other medicaments, it was natural to assume that continuous maintenance of a drug in blood above some minimal threshold concentration for inhibiting organisms, was *sine qua non* for successful therapy. Consequently, much effort was spent in devising methods that would permit prolonging the duration of therapeutic levels, while at the same time reducing the necessity for frequent injections much less continuous I.V. drip. Products for producing blood concentration for 2, 3 or 4 days were obtained. Meanwhile there was a trend away from this continuous therapy, employing one relatively massive dose of penicillin in aqueous solution every 24 hours.

As noted already, discontinuous therapy receives justification from the facts that blood concentration is not necessarily a true indication of lymph or tissue concentration and that the clinical efficacy of a single large dose is of greater duration than would appear from considerations of blood levels. " If a little is good, more will be better " is not a dictum applicable to antibiotic therapy. There are definite optimum concentrations for killing bacteriæ, killing is less rapid at concentrations above as well as below the optimum.

Further it is now recognised that penicillin may exert a " residual effect " in animals. To put it differently, blood and other body fluids may be unsuitable media for growth of bacteriæ for sometime after detectable concentrations of penicillin are no longer present. It is also recognised that following exposure to an inhibitory concentration of penicillin, bacteriæ need a " recovery period " before they can resume growth, even if they are in a medium that normally would be suitable for multiplication. It has been clinically shown that taking restoration of normal temperature as a criterion for control of infectious diseases, the following has been noticed. Temperature charts of pneumonia patients treated with (1) 300,000 units of procaine penicillin suspended in oil daily (2) 20,000 units of benzyl penicillin in saline every two hours, and (3) 300,000 units of benzyl penicillin in saline in one injection daily—all seemed essentially identical.

The first two tend to continuous blood level of penicillin at or above 0·2 units per c.c. The benzyl

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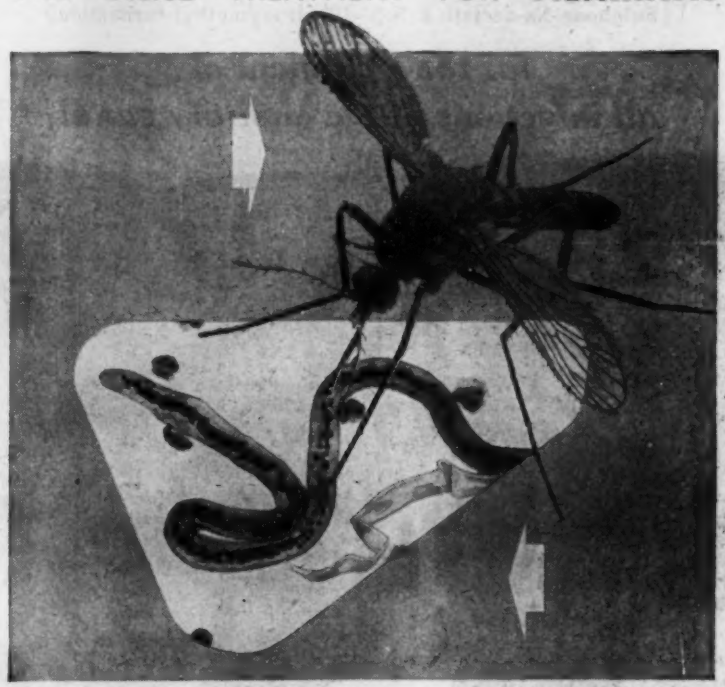

'Banocide,' a new non-metallic compound, which is administered orally, is markedly active against filariæ, especially *Wuchereria bancrofti* and *Onchocerca volvulus*. It is particularly effective in killing microfilariæ and even in moderate dosage causes their rapid disappearance. In some cases of bancroftian infection which have been carefully followed up, the blood has been found negative a year after treatment ceased, an observation which suggests that the adult worms have also been killed. The toxicity of the compound is low and its stability is unaffected by hot climates. 'Banocide' is issued as compressed products of 50 mgm. in containers of 20, 100, 1000 and 5000.

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penicillin in saline kept blood concentration for about six hours and then dropped rapidly and after 8 hours no detectable amount was in blood. Similar effective cures have been obtained in other infections. Discontinuous therapy has now been instituted as a routine in most hospitals in U.S.A.

Let not this be misconstrued for nonchalant treatment. Although it is not necessary for penicillin to be present in blood continuously, the interval between doses *i.e.*, the period during which the concentration of antibiotic in blood is below the minimal effective level, must not be sufficiently long or must not recur frequently to permit resumption of bacterial growth. The analogy is that of a boxer in the ring who has his adversary down. It is not necessary to keep beating the opponent when down. The effective method is to wait until he is just ready to stir, then to hit him again. This is also economical. This is also confirmed by experiments showing that the total amount of penicillin to be administered is more efficiently used if given in a few large doses, than at frequent intervals, of smaller doses.

The same principle is also being adopted for streptomycin *vis a vis* tuberculosis. A single 2 gm. biweekly dose is probably more effective than daily 1 gm. dose. The current trend is toward smaller and less frequent dose of streptomycin in treatment of chronic tuberculosis. This is also safe from toxicity and resistance points of view.

PENICILLIN AND C.S.F.:—Until recently cerebro spinal barrier was thought to be impermeable to penicillin. To-day we know that penicillin can pass into c.s.f. Permeability is increased in inflamed conditions and organic diseases of the central nervous system as meningitis and neurosyphilis. A single injection of 500,000 units will produce adequate bactericidal level in c.s.f. after 4 hours of intramuscular injection. Penicillin is fairly uniformly distributed in c.s.f. Diseases which cause excessive protein to appear in c.s.f., cause greater permeability of penicillin.

DANGERS OF INTRATHECAL MEDICATION:—It may not be out of place in this context to refer to dangers of intrathecal medication in general. Experience with intrathecal anæsthetics, sulpha drugs, antibiotics, revealed delayed neurological complications. The delayed hazards may often outweigh immediate benefits. There is even evidence that intrathecal administration of a drug produces therapeutic effect only after absorption into general circulation. Delayed chemical meningitis, occlusion to flow of c.s.f. leading to serious neurological complications have been noticed. Hence it is the path of safety to avoid, if possible, intrathecal medication as it tends to be meddlesome and mischievous.

PENICILLIN IN ANAEMIAS:—Anæmia of pregnancy is said to respond to penicillin strikingly. Five to ten days after the first injection, there was maximum reticulocyte response. Response was similar to liver therapy or folic acid or even vitamin B_{12} therapy. Bone marrow is said to revert to normal conditions. It is suggested that this may be due to (1) change in flora of gut which may lead to destruction of antagonists or competitors or other factors that interfere with synthesis, absorption or utilisation of hæmopoietic factors or (2) interference with bacterial metabolism thus releasing hæmopoietic factors for use in the body or (3) effect a change in protein metabolism and help synthesis of nucleoprotein from essential amino acids or (4) destruction of toxins produced by bacteria which have deleterious action on bone marrow or (5) who knows if penicillin itself presents a hitherto unknown hæmopoietic factor. Has not a similar product been obtained from *Streptomyces griseus*?

At a symposium on antibiotics held in connection with the festival of Britain, the chairman, Sir Alexander Fleming, the discoverer of penicillin, observed in conclusion that "....very little is talked of the remarkable growth-stimulating property of penicillin and perhaps other antibiotics." He brought the meeting to a close in lighter vein with a slide showing a big and a small turkey of the same age, the former having been fed on a diet containing penicillin.

Reactions to Penicillin—After extensive use of penicillin in treatment of syphilis, it is noticed that at least 10 per cent of cases show reactions, fortunately of a mild nature. Penicillin resembles an amino acid and one should not be surprised if it shows allergic reactions. Urticaria, pompholyx type of reactions, sometimes Herxheimer reactions are noticed. There can even be an initial exasperatation in nonsyphilitic conditions. A new hypo-allergic penicillin which is a combination with an antihistamine drug is on the market. Like sulpha compounds, skin sensitisation to penicillin are reported. Penicillin dermatitis as a result of using cream with purified penicillin are said to be on the increase. Such a patient may react violently to a later injection of penicillin given for a different systemic disease. It is also noted that individuals with fungus infections sometimes react violently to penicillin treatment. Fungus and penicillin are of the same clan.

It is said that among antibiotics, tyrothricine alone is safe as a skin medicament.

Resistance to Penicillin—This subject and the wider antibiotic resistance are studied in different laboratories. How strains of organisms initially sensitive emerge ultimately resistant is receiving attention everywhere. Mutation, natural selection, adaptation have all been proposed. Fortunately, clinical experience indicates that development of penicillin resistance does not occur as commonly *in vivo* as *in vitro*. It is also a hopeful sign that resistance here is achieved at the expense of aggressiveness generally and at the price of loss of ability to rapidly multiply. (Is streptomycin *vis a vis* tuberculosis an exception)?

Acquired resistance is the most important limiting factor with any antibiotic. To-day the arguments are on the mode of production of resistance, if it is as a result of mutation or adaptation. For a genetic alteration in character to occur, sexual conjugation would appear to be necessary. Since bacteria multiply by simple fission, the transmission of an acquired character seems impossible. Mutation is nevertheless a factor. Minute number of cells in a bacterial population never before exposed to streptomycin, could be shown to be many times more resistant than the main mass and it was these cells that came to the fore, when an infection with such an organism became resistant to streptomycin. As for penicillin, however, the capacity for *in vitro* habitation of organisms varied considerably. The resistance of meningococcus to penicillin could be increased half a million fold, that of gonococcus a thousand fold, that of pneumococcus only slightly while the resistance of hæmolytic streptococcus group could hardly be increased at all. The resistance of staphylococcus aureus could be increased 350,000 times. Fortunately, these high degrees of laboratory resistance have no counterpart so far in the clinical field, except in the case of staphylococcus aureus and it has been clearly shown that the increase of penicillin-resistant strains encountered was simply due to a selection of originally penicillinase-producing staphylococci, possibly as a result of wide use of drugs. It is also said that penicillin-sensitive strains of staphylococcus aureus depend on external source of glutamic acid for their growth, while the penicillin-fast strains of staphylococcus aureus have the ability to biosynthesise glutamic acid.

Streptomycin resistance could develop it is said in nearly all organisms in 20 generations and the drug will have diminished usefulness in future. It is thought that the only organisms that would continue to be amenable to streptomycin treatment are those causing diseases conveyed from animal to man such as plague and tularæmia.

Resistance of moderate degree could develop both *in vitro* and *in vivo* to chloromycetin, aureomycin and terramycin and when it occurred it looked as though the three are embraced to some extent *i.e.*, organism is resistant or susceptible to one another.

The prospects gauged by these observations are that staphylococci, intestinal group of organisms and tuberculosis organism might gradually become less and less amenable to attack by the resources at our disposal. The elusive microbe defies subjugation.

Antibiotic dependance—A strange corollary to the problem of acquired resistance to antibiotics is the peculiar phenomenon called 'antibiotic dependance' or acquired dependance of organisms to antibiotics Varying degrees of streptomycin dependance have been described ranging from complete dependance *i.e.*, no growth in the absence of the drug to partial dependance in which the organisms require the antibiotic for multiplication, but do show residual or stunted growth when deprived of streptomycin. Streptomycin-dependant bacteriæ have a peculiar metabolic need which apparently can be satisfied only by a supply of streptomycin. Streptomycin inactivated by cystin or by semicarbozide will not satisfy the requirements. It has also been observed that streptomycin-resistant E. coli may become streptomycin-dependant in the presence of PAS or paramino salicylic acid. Yet another strange fact is that dependance seems to be at a particular concentration which is optimum; anything over or under has inhibitory effect. Similar study with penicillin is not available.

Synergism and Antagonism in Antibiotics—This is a new study that promises to have far-reaching consequences. It is an axiom that two or more chemotherapeutic agents acting together may produce effects better than one, as exemplified in the treatment of malaria, amœbiasis or syphilis. The effect of such a combination may be additive or synergistic, the gap in the one being filled by the other. The subject of polyantibiotic therapy is to bring into play concomitantly or successively two or more antibiotics that will act in different ways. Theoretically if a pathogen is attacked effectively through two or more channels it should succumb more readily than when attacked from one quarter. This is just military strategy. Could it be applied to man's battle against micro-organisms? If a resistant member of a bacterial population can stand frontal attack by one that is usually effective for most of the cells, these resistant cells may have to encounter a lateral attack by another antibiotic. Two antibiotics that affect two different links in the chain of bacterial metabolism are better than one. To illustrate, penicillin blocks depolymerisation of mononucleotides while streptomycin intervenes at another link *i.e.*, at the process involved in depolymerisation of nucleic acid macromolecule.

But this logic is not always true in practical antibiotic politics. Polyantibiotic therapy can be less effective than mono-antibiotic therapy. For instance, penicillin and streptomycin synergise or help each other in the treatment of enterococci and streptococci involved in bacterial endocarditis. But penicillin and chloramphenicol antagonise each other in the treatment of infections due to beta hæmolytic streptococci. In mice infected with streptococcus pyogenes, mortality after treatment with penicillin and chloramphenical was 3 times as much as those treated with penicillin alone.

A bacteriostatic agent like chloramphenicol and aureomycin if combined with bacteriocidal agents like penicillin or streptomycin, the effect is not additive or synergistic but nullifying or antagonistic. It looks as though chemically and pharmacologically dissimilar substance are capable of being combined in treatment rather than chemically and pharmacologically allied substances. Streptomycin and PAS synergise very well so far. Exception perhaps is where bacitracin seems

to synergise penicillin in the treatment of syphilis. Eagle has reported curative action of rabbit syphilis to as little as 1/40 of curative dose of penicillin if combined with 1/7 of bacitracin. Yeast, on the other hand, tends to reverse the action of penicillin. Improved antibiotic therapy may also be obtained by joint use of organic and inorganic medicaments or even by joint use of antibiotic and pyrexia therapy. (However, to-day arsenic is gradually being discarded as its synergistic action, if any, on penicillin is not commensurate with its toxic potentialities). Sulpha compounds as a class (not all) have proved valuable synergisers of antibiotics. Use of oral sulphadiazine with parenteral or intrathecal penicillin has been advised as a routine for treatment of meningitis due to pneumococci, streptococci and H. influenza. Combined use of penicillin and sulphadiazine has been recommended for various forms of pneumonia, empyema, lung abscess, in peritonitis, non-specific urethritis, gas gangrene and fulminating meningococcæmia. Joint use of sulphadiazine and streptomycin is much more effective in brucella infections—it has indeed become standard treatment. Joint use of other sulpha drugs and streptomycin has been recommended as a preparatory for surgical treatment of colon.

The fact that one member of sulpha group enhances antibacterial action of a given antibiotic affords no assurance that other members of the family will act similarly, for there have been instances where mixing of drugs tended to undermine the potency of either. At present there is no infallible way to predict whether the effect of a given mixture of antibiotic is to help, add or undermine each other. In the field of antibiotic therapy or perhaps in any therapy one cannot rely entirely on induction and logic. In trying to be too logical and scientific in therapy, one may be original or aboriginal. The vagaries of living organisms are numerous, peculiar and unpredictable. The only sure test in trial and experimental verification, trial being empirical. Result of *in vitro* experiments cannot be readily or directly transferred to human needs.

The result of all these reports of polyantibiotics synergism and antiagonism, joint use of other medicaments, resitance, dependance etc., is to emphasise the fact that the reaction system comprising host, pathogen and drugs is most complex and is easily altered by even slight changes in the internal or external conditions of either the host or the invading pathogen.

Streptomycin

Action:—Streptomycin is said to act by interfering with catabolism of nucleotide like penicillin but at an earlier stage *i.e.*, in the step in which nucleotides aggregate or macromolecules are depolymerised into smaller units. Streptomycin attacks organisms both in their active and resting phase, unlike penicillin which attacks only the active multiplying stage.

Only a few points of importance regarding streptomycin use is possible here. When 2 gm. of streptomycin were administered daily for more than 2 months, no less than 95 per cent of cases showed toxic symptoms. They included vestibular damage, severe dermatitis, kidney damage etc. It is now seen that 1 gm. daily for about 40 days can avert the danger, without seriously affecting therapeutic utility. Length of treatment more than height of dosage seems to be of more consequence.

Though streptomycin fastness as in mycobacterium tuberculosis is associated with reduced invasiveness *in vivo*, still sufficient pathogenicity still remains. Reference has already been made to streptomycin dependence or organisms that grow or multiply only with the help of streptomycin. But streptomycin dependant organisms appear to be unstable and revert easily to streptomycin sensitivity, or streptomycin tolerant or even resistant forms. Usually cross resistance is not the rule among organisms sensitive to antibiotics. Generally when an initially susceptible organism acquires resistance to a given antibiotic, its susceptibility to other antibiotics tends to remain unaltered.

In the case of terramycin (from *streptomyces rimosus*) increased resistance to terramycin is accompanied by decreased resistance to streptomycin. Conversely, increased resistance to streptomycin tends to induce greater susceptibility to terramycin. This is perhaps a hopeful sign in otherwise gloomy forebodings of antibiotic treatment in general. Dependance seems to suggest that administration of antibiotic will exacerbate clinical symptoms of infection. On the other hand the cross relationship between sensitivity to terramycin, aureomycin and chloramphenicol on the one hand and streptomycin and dihydrostreptomycin on the other, undoubtedly explains the salubrious clinical effect reported from joint use of streptomycin with terramycin or aureomycin or chloromycetin.

Indications for Streptomycin—The indications for streptomycin to-day, barring tuberculosis, are the following: (1) Longstanding urinary infections when multiple organisms are present. Streptomycin is 50 times as powerful when the urine is rendered alkaline to pH. 8. (2) Single dose of streptomycin 0·2 to 0·5 gm. has been found effective in gonorrhœa without masking subjacent treponema infections. Penicillin while being more powerful in destroying gonococci, may mask the treponema which go underground for later virulence. (3) Streptomycin has been found very effective in granuloma venerum. To-day it is deemed about the only effective drug in this condition. Chloromycetin also has some effect. (4) Streptomycin is also effective in plague; it is thought that it will retain its effectiveness without inducing resistance. (5) In brucellosis, streptomycin is effective when given with sulphadiazine.

Barring tuberculosis organism against which it has more or less specific action, streptomycin acts against certain Gram negative and Gram positive organisms Gram negative ones include *E. coli, brucella abortus, N. gonorrhœæ, Past. pestis* against which it is more

effective. Against Gram positive organisms, as a rule, it is less potent than penicillin. Anerobes like *Cl tetani, welchi* are highly resistant to streptomycin. The activity of streptomycin is reduced in acid medium; any tissue damage with acid reaction tends to undermine streptomycin effectiveness. Streptomycin is poorly absorbed from the gut, but its activity is not reduced or destroyed in the gut, if it escaped stomach acidity. Very little diffuses into c.s.f. after fairly large doses I.M., except in inflamed conditions. It can however, be administered intrathecally, barring the usual risks associated with intrathecal medication. Streptomycin remains in c.s.f. for about 24 hours.

Streptomycin and Dihydrostreptomycin—How far is the latter an improvement over streptomycin? Dihydro compound has no effect on organism rendered resistant to streptomycin. Its freedom from toxicity is but relative; it is indeed capable of all the toxic manifestations of streptomycin. In therapeutic efficiency, dihydro compound in equal doses is inferior to streptomycin. Intrathecally, dihydro compound is more irritant than streptomycin. It can, therefore, be tried only in those cases which are unusually sensitive to streptomycin, and that is about its only superiority over streptomycin.

The following summary of streptomycin seems to be apt "Streptomycin is a fragile weapon with ill-defined boundaries separating good from evil in its effect. Every patient treated unsuccessfully with streptomycin brings nearer the day when no patient will be able to be treated with streptomycin at all" (*Brit. M. J.*, 2: 1099, 1949).

Chloromycetin

This was hailed first as a valuable chemotherapeutic agent in rickettsias—typhus in particular. Then it was found useful in viral infections like atypical pneumonia and lymphogranuloma venereum. Later chloromycetin and its synthetic substitute chloramphenicol were hailed as a valuable, if not the only antibiotic against typhoid (Chloromycetin is the only antibiotic where the synthetic substitute or chloramphenicol is commercially capable of replacing the natural compound).

Chloramphenicol and Typhoid—The dosage of this compound for typhoid is still undecided. It is thought that frequency of relapse is due to insufficient dosage at the initial stage. In 1 gm. doses hourly for 3 or 4 doses, followed by 0·25 gm. doses hourly for 2 days, fever and toxæmia disappear in 2 or 3 days, with a return of appetite, almost voracious appetite. This dosage scheme looks to be on the excess side and even with this, relapses are frequent. With much less dosage, some clinicians have obtained as good results. Increased initial dose or prolonging the treatment for some time after fever has come down, has not given conclusive data for avoidance of relapse.

Some hold the view that reinforcing chloramphenicol with penicillin or one of the sulpha compounds may reduce relapses.

By itself, chloramphenicol is a bacteriostat and it is doubted if it can be combined with a bactericide like penicillin. However, all efforts are being made to reduce chances of relapse in typhoid after chloramphenicol. It has recently been noted that in appropriate doses, chloramphenicol, aureomycin and streptomycin are more effective, than any single drug.

A Warning—An important point to note regarding typhoid treatment with choramphenicol is that patients become afebrile before intestinal lesions are healed. Hæmorrhage and perforation have been noticed fairly frequently after defervescence of fever. This is a caution to go slow with ambulatory treatment after return of temperature to normal. Treatment with antibiotic has not dispensed with nursing and dietary observances in typhoid.

Typhoid Carriers—The carrier state in typhoid is still a mystery. Chloramphenicol has not prevented carrier state. Sometimes patients who have been successfully treated for typhoid, become carriers. Chloramphenicol is not effective in shigellosis.

Toxic Actions—These are not definite to-day. Though it is readily absorbed from the gut, some have noticed diarrhœa and abdominal discomfort. Some have reported blood dyscrasias, such as leukopenia and bone marrow changes. When large doses are given in the treatment of typhoid, occasionally a state of collapse or profound depression is noticed which is either due to sudden fall in temperature or to the drug or both. (Chloramphenicol can cross the placental barrier to enter fœtal circulation).

Other uses of Chloramphenicol—The Ministry of Health in U.K. had given a provisional list of diseases where it is indicated with good, or satisfactory results. (1) Infections where chloramphenicol is deemed superior to penicillin or sulpha drugs are typhoid, paratyphoid, excluding carriers, brucellosis, rickettsias like typhus, Q fever, virus diseases like lymphogranuloma, atypical pneumonia and psittacosis, urinary infections of resistant nature due to *E. coli, B. proteus, Ps. pyocyaneus and streptococcus fæcalis*. (2) Infections where results are satisfactory but not fully substantiated include whooping cough, salmonella and H. influenzal meningitis and (3) Infections where it is not likely to be superior to others or of any value are influenza, poliomyelitis, tuberculosis, syphilis, virus of cold etc. Regarding cholera, it will be possible to use chloramphenicol as a prophylactic, as cholera vibrio are readily destroyed by this antibiotic. But the disease of cholera itself, after setting in of symptoms of dehydration are not benefited by chloramphenicol.

Aureomycin

In 1949, the Ministry of Health in U.K. had restricted the use of aureomycin to (1) brucellosis (2) lymphogranuloma and (3) proved cases of virus pneumonia. But auremycin since has found place in the treatment of several other conditions. The advantage

of aureomycin over other antibiotics seems to be its extensive range of action, its low toxicity (?), its absorption by the oral route and mostly for the reason that organisms show least tendency to develop resistance.

Aureomycin to-day finds a place in the treatment of typhus, wider range of brucellosis, all varieties of pneumonia, amœbiasis and even syphilis. But it is the duty of medical men knowing that different organisms affect different systems or the same organism affects different organs to use the knowledge of different chemotherapeutic agents rationally seeing that antibiotics have overlapping effects.

Toxic Action—Orally aureomycin may cause nausea and looseness of bowels to a worse extent than chloramphenicol. A purified crystalline form is said to be better here, but even the new compound had given abdominal discomfort and diarrhœa. Sometimes vitamin administration seems an essential part of aureomycin therapy. Strange symptoms of euphoria and cerebral irritation of a mild nature have also been noticed.

Blood level of aureomycin is not a correct index of its utility therapeutically. This fact seems to be urging itself with most antibiotics. No inactivating enzyme corresponding to penicillinase has been found so far, nor have resistant organisms been registered.

Aureomycin Intramuscular—Nausea, vomiting and diarrhœa having been frequent with aureomycin by oral route, it was tried intravenously. This led to thrombophlebitis in the early days, though the recent purer samples are better. Intramuscular use has been too painful, specially when repeated, probably due to low pH of the solution. A better I.M. or subcutaneous compound is really in need for rapid effect and to overcome gastrointestinal irritation. Mixing with 1 per cent procaine a buffered aureomycin, did not reduce pain to any great extent. A new compound has been suggested consisting of 2·5 gm. of aureomycin in 5 c.c. of olive oil which has previously been washed with alcohol and sterilised. Procaine penicillin with sesame oil with aluminum monostearate 10 c.c. is then added warmed shaken, administered I.M. The vehicle is said to delay absorption and prolong action of aureomycin. One I.M. injection b.d. suffices for many acute conditions. No local reactions have been noticed in several hundred cases according to Seyberlich (1951)

Uses of Aureomycin—To-day aureomycin has best application in the following conditions that are not amenable to earlier antibiotics satisfactorily. (1) Brucellosis—better in *Br. melitensis* than *Br. abortus*—0·5 gm. every 6 hours on the first day increased to 0·75 gm next day upto a total of 5·6 gm. Combination with streptomycin is said to give better results. (2) Staphylococcal infections that are resistant to penicillin and streptomycin. Many conditions of osteomyelits, septicæmia, mastoiditis, carbuncle etc. respond well. (3) Most virus infections like lymphogranuloma, atypical pneumonia, psittacosis also respond satisfactorily. It is too early to say if the effects are better than with chloramphenicol. (4) Aureomycin gives us hope of curing amœbic infections both acute and chronic. This, if established, should make aureomycin a very precious therapeutic agent.

Bacitracin

This antibiotic was once used topically in pyogenic infections of skin. To-day it is found that bacitracin has remarkable effect on amœbic dysentery; amœba disappear from stool, ulcers are said to heal rapidly and clinical improvement is perceptible. A dose of 80,000 units daily I.M. for 7-10 days is recommended. It is being studied if bacitracin is superior to aureomycin here. It is possible to combine either of these with other antibiotics. Bacitracin with penicillin did very well in the treatment of syphilis, synergistic action being evident.

Other Antibiotics

One could just pass over antibiotics like Gramicidin, Tyrocidine, Polymyxin etc., to mention that it is the culture fluid from Grisein, a variety of streptomyces that yielded a precious by-product similar to or identical with vitamin B_{12}. The other antibiotics are too toxic or inappreciably active therapeutically. And that leaves 3 new entrants with some promise. They are Terramycin, Neomycin and Viomycin.

Terramycin

Obtained from *Streptomyces rimosus* it is amphoteric. The sodium salt of terramycin is alkaline while the hydrochloride is acidic. The hydrochoride is given by mouth in 2-4 gm. doses in capsules every 6 hours. An interesting point about the absorption of terramycin is that there seems to be a limit to its absorption; large doses do not appreciably increase blood level. Much remains in the gut to exert a disinfectant action in the gut. Terramycin reaches bile in high concentrations but not c.s.f. It stands intermediate between chloramphenicol and aureomycin for blood concentration *i.e.*, in equal doses choroamphenicol ensures maximum blood concentration. Urine concentration is, however, higher with terramycin. In action it resemles aureomycin generally. Organisms of tuberculosis, typhoid, proteus and pyocyaneous are unaffected by terramycin. Its possible uses are (1) all pneumonias including virus pneumonia (2) septicæmias (3) brucellosis (4) rickettsias (5) amœbiasis and (6) possibly pertussis. All the venereal diseases respond to terramycin as to aureomycin.

Toxic effects in children treated for whooping cough consisted of various degrees of abdominal pains headache, anorexia etc. These symptoms disappeared on stopping the drug. One may say that terramycin is a rival to aureomycin. If organisms develop resistance is not evident yet, nor the susceptibility of organisms that have developed resistance to other antibiotics. It looks as though these two factors are touchstones for a good antibiotic that comes up anew.

NEOMYCIN

This is indeed an earlier antibiotic and was thought to be a nontoxic substitute for streptomycin and effective in streptomycin-resistant cases. It is the first antibiotic to be active against *Ps. pyocyaneus and B. proteus*. But its toxicity seems to be an unreliable factor. Kidney damage has been noticed in patients treated with this for tuberculosis.

VIOMYCIN

From *Streptomyces punicea*, its mycelium is purplish in colour and hence its name. It is a strong organic base and forms neutral salts. Said to be active against all acid-fast organisms. In experimental mice infected with tuberculosis organisms, viomycin is said to have conferred immunity in 90 per cent of cases. However the last two are *sub judice* in 1951.

REFERENCES

EAGLE—*Bull. Johns Hopkins Hosp.*, 79: 168, 1949.
Festival Symposium in Antibiotics—*Brit. M. J.*, 1: 1384, 1951.
Penicillin and Megaloblastic Anæmia—*Brit. M. J.*, 1: 1108 1951.
ROBERTSON, *et al.*—Mechanism of Antibiotic Action and Trends in Antibiotics. Texas Report on Biology & Medicine, Spring, 1951, p. 75.
SEYBERLICH—*Lancet*, 1: 843, 1951.

STUDIES ON HOOKWORM INFECTION

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The enormous importance of ankylostomiasis for India from the medical and economic points of view has been hardly sufficiently recognized. There are no reliable figures available about the frequency of this infection because the majority of cases remain undiagnosed and no attempt has been made to take a census of affected people on anything like an all-India scale. Based on the assumption that hookworm disease is particularly widespread in the tea gardens of Assam, in Bengal, in the tea and coffee estates of Coorg, Travancore, and South Kanara, and moderately endemic in Behar, the eastern parts of U.P. (especially the Terai) and in some parts of Madras Presidency, it was estimated that about 210 million cases were present in undivided India with a frequency, varying from 40 to 70 or even 80 per cent (Simmons *et al.* 1944) in these parts of the country. The map which illustrates these figures (Simmons *et. al.*, 1. c) shows the whole of Rajasthan as a white spot, and Maplestone and Mukerji (1939) state that "Rajasthan has little infection", making it very probable that the figure of 210 million represents an understatement.

When I first came to Jaipur, straight from the hookworm work in Mysore, one of my first questions in the new wards was after the frequency of ankylostomiasis here; I was not much surprised to hear that hookworm infection did not occur in this part of the country. The difference between the moderately moist and heavy soil of Mysore and the dry, sandy one here, seemed sufficient explanation for the great number of hookworm cases there and their absence here. But the real surprise came when the regular application of the floatation method to stool examinations soon showed that ankylostomiasis does exist here frequently and sometimes occurs in the severest form as seen anywhere in the world, a red cell count of 0·5 or 0·6 million and a hæmoglobin percentage of less than 10 per cent (Sahli) being no rarity.

During the last two years 307 patients have been admitted to our medical wards because of hookworm disease; that means that after thorough investigation ankylostomiasis had been found to be the cause of the trouble for which these patients came to hospital; mere hookworm infections, detected as a result of routine examinations, have not been included in the following figures.

Year	Admissions to Medical Wards	Hookworm disease	Percentage
1949 ...	2372	146	6.15
1950 ...	2872	161	5.7

These figures are very much higher than those found recently at K. G. Medical College Hospital, Lucknow (Khare, 1951) where the highest annual figure has been 57 cases of ankylostomiasis among 3366 patients, representing 1·6 per cent of all medical admissions in 1949.

And, yet, they are certainly much lower than the real number of heavy infections, the villagers coming to our hospital, which is comparatively far off from their home, representing only a fraction of those who are in need of treatment and, particularly, of proper diagnosis. Moreover, for an illness which causes neither pain nor fever, our kheti will seek admission only if there is no urgent work to do in the fields except, of course in the worst cases who are unable to guide the plough anymore. Pressure of agricultural work or leisure, therefore, are responsible for great seasonal variations in the number of hookworm cases in the wards at a particular time.

The close connection between urban and rural life in India is demonstrated by the frequency of ankylostomiasis among people living in Jaipur city, particularly the quarter near Galta gate and the very heavy infections occurring among the vegetable growers living near Ajmer road on the outskirts of the town. The geographical distribution exactly coincides with the fertile, cultivated parts of our territory, whereas the desert areas seem to be much less infected.

DIAGNOSIS

There is only one way to establish the diagnosis of ankylostomiasis beyond doubt and that is to find

the ova, which requires a patient search of often more than one motion and the use of a concentration method; that is so because there is not one sign or symptom which is diagnostic of this infection and hookworms are not passed out without treatment as ascaris, tæpia or oxyuris are, so that the patient's attention is not attracted to his infection. Ankylostomiasis, therefore, is one of the pathological conditions which will be diagnosed only if one thinks of it. This explains that a heavy infection rate may exist in an area and yet remain undetected, a routine examination of motions and application of the floatation method being outside the scope of the rural practitioner or even an average hospital.

Under such circumstances, only a full knowledge of the whole clinical picture, including characteristic features of the history, will be conducive to a justified suspicion that one has to deal with a case of hookworm disease, leading to a persistent search for the parasite's ova.

History. What a patient suffering from hookworm disease has to tell spontaneously is highly uncharacteristic and depends on the degree of anæmia as well as on other simultaneous infections. The majority of these patients are working on the land as small "Zamindars" or as agricultural labourers and they clearly demonstrate that a case of ankylostomiasis, that is somebody harbouring the worm, becomes a patient suffering from hookworm disease usually due to concomitant nutritional deficiency or a co-existent debilitating illness, such as malaria which is present in the majority of our cases or, particularly, chronic diarrhoea. Usually, the complaints centre round weakness, and fatigability, so that it becomes difficult to complete one's daily routine; frequent are also vague complaints of fullness in the epigastrium, heaviness after meals, diminished appetite and, finally, absolute anorexia. None of these complaints are in any way characteristic of ankylostomiasis, but if a father complains that a child, in spite of all admonitions, persists in eating mud or a young adult without hesitation confesses to have the same habit we have the first hint that a search for hookworm ova might be successful.

Age and Sex distribution. Children being very susceptible, their percentage among our cases is rather high; adolescents and adults up to the age of 40 make up the rest. Men are more in number owing to their occupation outside the house, walking barefoot over the soil contaminated with larvæ-containing fæces or actually, as in Mysore and China, treading with their bare feet fæces, as manure, into the fields. But females are not at all exempt as promiscuous defæcation next to their houses and the habit of walking barefoot even for short distances bring them in closest contact with infective fæces, worked into the soil by man and dung beetles; in fact, low resistance due to numerous pregnancies and deficient diet bring about some of the severest cases of hookworm disease from among young women. People after 40 or 45 are much rarely affected, probably because of some kind of immunity which develops with the years. The exact nature of such a defence mechanism is not known; one can only say that there is a fair degree of protection present and yet this condition is not due to the presence or the effect of antigens and antibodies.

Appearance. This is so characteristic that the best method of teaching a student how to recognize on sight a case of hookwork disease is to show him a dozen cases of this kind. The patients are mostly slow in their movements as well as in their speech. On admission they are patient, gentle and rather passive, easily satisfied like a melancholy child or a woman suffering rheumatoid arthritis. Their face, in moderately severe cases, has got an earthy, grayish, light brownish tinge, the skin is smooth and always a bit puffy, particularly round the eyes. The sclerotics usually show some dirty discolouration, due to generalized deficiency and chronic malaria, but they are not icteric, the serum bilirubin of uncomplicated cases being not increased. The lips are pale, but of real diagnostic value is the appearance of the tongue which looks as if smeared with clay. In every other anæmia the tongue preserves a pinkish tinge, be it even very faint, but here it is as if the tongue had been drenched of every drop of blood, so ghastly white or grayish-white does it appear although it is neither covered nor furred. The palate usually shows exactly the same colour. In severe cases of hookworm disease the puffiness increases and such cases might show the highest degree of general anasarca, indistinguishable from the appearance of the nephrotic type of subacute glomerulonephritis. The differential diagnosis is very easy; hookworm disease never affects the kidney and is not associated either with albuminuria or with casts and erythrocytes in the urinary deposit.

Hookworm Problems

Anæmia and its treatment, the heart condition and its causes, how the worm produces signs and symptoms of hookworm disease and, finally, how to get rid of the hookworm effectively and safely, these are some of the questions which we investigated in the course of the last ten years.

The anæmia, the central manifestation of hookworm disease, is always of the hypochromic and usually of the microcytic type. To give an example of the blood picture of an untreated case of hookworm disease, we are giving here the figures of a patient, admitted recently to our wards, compared with the normal average figures.

Ananda, a wellbuilt Gujar, ago about 18 years, coming from Sikrai—

				Normal
3-10-51	Hæmoglobin	2	Gm. per cent	14·5 Gm.
	R.B.C.	0·9	million	5 million
	P.C.V.	7·36	c.c. per cent	47
	M.C.V.	81·8	cu microns	87
	M.C.H.	22·2	micromicrogram	27·5
	M.C.H.C.	27·1	per cent	35

The anaemia is so strictly an iron deficiency anæmia that full doses of ferrous sulphate raise the red blood count and hæmoglobin to any desired level inspite of persistent worm infestation (Napier *et al*, 1941, Heilig, 1941). This fact is of great practical importance. It permits deworming at optimal conditions for the patient; it makes it unnecessary to give carbontetrachloride or tetrachlorethylene at a time when the resistance of the liver to such toxic drugs is low, due to the anoxæmia caused by severe anæmia. The invariably satisfactory response to iron therapy makes it possible to chose a safe hæmoglobin level at which to carry out deworming.

Our experience in hundreds of cases shows that 30 per cent hæmoglobin (Sahli) is the borderline of safety; carbontetrachloride is a deadly liver poison below this mark and a very effective, practically harmless, anthelmintic above it, provided a few protective injections of calcium gluconate are given preceding it and the patient is kept in bed on the day of deworming.

From the diagnostic point of view, the prompt and full response of hookworm anæmia to iron occurs so regularly that any deviation from this rule, lack of response or unusually slow response to iron, are reasons enough to search for an additional infection, co-existent with ankylostomiasis (Heilig and Visveswar, 1942 a,b). Subclinical malaria, urinary tract infections, sinus or middle ear infections are the most common causes of iron refractoriness; subfebrile temperature or an occasional higher rise of temperature is a strong indication that hookworm infection is not the only pathological condition in such a case. As ankylostomiasis by itself never causes fever, its occurrence is a reminder that the cause of the pyrexia must be found to avoid disaster, because under these circumstances the anæmia is not stationary but progressively deteriorating due to the combined effect of two or more infections on the bone marrow. The consequence is a complete breakdown of hæmatopoiesis, not only of the red cells but also of the white ones and of platelets; leucopenia with granulocytopenia dangerously lower the resistance to pyæmic infections; thrombocytopenia leads to purpura, the appearance of which signifies that the end is near. On the other hand, discovery and elimination of the "second" infection or infections, is rewarded by splendid success; weeks of retarded blood regeneration are made up in days and a patient who was declining before our eyes recovers surprisingly quickly.

According to Robson and Keele (1951), infection renders iron-deficiency anæmias iron-refractory by reducing iron absorption, diminishing the iron-binding capacity of serum, the saturation percentage of iron-binding proteins and, finally, by obstructing hæmoglobin synthesis.

Here a remark on *intravenous iron therapy* is indicated. Off and on, one does meet a case of perhaps uncomplicated but particularly advanced hookworm disease where iron by mouth is not tolerated; in such cases Blaud's pill and other uncoated forms of ferrous salts, provided in hospitals, cause vomiting or diarrhoea. In previous publications, I pointed out that the condition of such patients becomes critical. Nowadays, saccharated iron oxide for intraveous injection is available and it is no exaggration to say that the effect of intravenous iron in such cases is sometimes lifesaving. By starting with small doses and increasing them gradually, by mixing the drug with the patient's blood in the syringe and by injecting slowly, undesirable reactions can be usually avoided.

Another fascinating problem in hookworm disease is *the condition of the heart* (Heilig, 1942). Contrary to statements in most text-books, these patients rarely complain about dyspnœa, palpitation, orthopnœa or any other cardiac discomfort. I pointed out that an important differential diagnostic feature from mitral valvular disease is the ease with which hookworm patients are lying flat without laboured breathing or cyanosis. Heart size and shape vary predominantly with the severity of the anæmia; from fairly normal in either respect to the size of a cor bovinum with the shape of an old mitral or a combined aortic-mitral valvular disease, every stage and degree occur. But at every stage and in every case, one finds on fluoroscopy an expansile pulsation and a sort of churning movement of the felt ventricle, accompanied by expansile pulsation of the aorta, features which are so characteristic that they helped us to detect a good many unsuspected cases, later confirmed by stool examination. It is diagnostic of ankylostomiasis to find on screening a heart of almost normal shape or one of rather mitral configuration with movements, seen otherwise only in aortic regurgitation, and easily distinguishable from the brisk pulsation of other anæmias or vasomotor neurosis. On auscultation, we find a harsh systolic murmur, the maximum of which is heard in the 3rd left intercostal space, near the left border of the sternum; it is usually quite obvious that this murmur is not loudest in the apical area, though sometimes fairly well conducted towards the axillary region. These characteristics, together with appearance and behaviour of the patient, permit diagnosis from mitral heart without great difficulty. In the text-book this murmur is explained as hæmic murmur. My electrocardiographic investigations (Heilig, 1942) leave no doubt that in hookworm disease the heart muscle is severely damaged, the ecg showing all features of diminished myocardial tone, such as low amplitude flat or iso-electric T etc., so that the murmur most probably is caused more by the myocardial condition than by increased blood velocity and diminished stroke volume.

It is interesting to see how in most cases blood regeneration and cardiac improvement progress simultaneously under the influence of iron treatment. In about 90 per cent of our patients physical signs, radiologic appearance and ecg approach normal conditions strictly parallel with increased hæmoglobin

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and red cell figures, even before anthelmintic treatment has been started. That means, obviously, that in a large majority of hookworm patients, the pathological heart condition is caused by lack of iron, hæmoglobin and, particularly, of oxygen. In these cases, the hookworm infection acts on the myocardium indirectly through the hæmatological changes.

There remain, however, about 10 per cent of cases a small but constant and interesting minority, whose heart condition remains surprisingly constant uninfluenced by the normalized blood picture as long as hookworms remain in the gastro-intestinal tract. The size, shape and action of the heart as seen on fluoroscopy, character and loudness of the murmur as well as the ecg do not show any improvement until deworming has been complete. In fact, we could predict in such cases from the ecg alone whether the patient had got rid of his last worms or not, and stool examinations proved us right.

Rough estimates did not show heavier hookworm infection in that minority group. It seemed probable, therefore, that these cases were more sensitive to some specific effect of the hookworm than the others. Using such hookworm sensitive cases, we tried to solve the old problem whether a *hookworm toxin* exists (Heilig and Visveswar, 1943). Dr. Raghunatha Rao, at our request, perfused frog hearts with highly diluted serum of hookworm patients serially, before treatment, when the anæmia had improved, and again after deworming. Sera of untreated cases had a strong depressive effect on the frog's heart an effect which in the majority of cases decreased with progressive improvement, even before anthelmintic treatment has been performed; whereas in a small group which showed the puzzling discrepancy between hæmatological improvement and persistent cardiac damage, the pharmacologist, working without any knowledge of the clinical findings, found that the depressive effect of the sera on the frog heart was maintained until deworming was achieved. These results do not prove the effect of a hookworm toxin but are easier to interpret when its existence is assumed.

Another question which we studied is the relation between *blood status and gastric function* (Heilig and Visveswar, 1942c). Having seen that the response of uncomplicated hookworm anæmia to iron medication is always fully satisfactory and having found that hypochlorhydria and achlorhydria are very frequently present in such cases, we wanted to know whether improvement of the red blood cell picture is accompanied by an increase of gastric acidity. The answer is that the composition of the gastric juice, as far as acidity and pH are concerned, remains entirely uninfluenced even by a complete regeneration of the blood. Another rather interesting and unexpected finding of this investigation was that speed and extent of blood regeneration are independent of the degree of acidity; this is possible only if the iron is absorbed irrespective of gastric acidity which is contrary to the well known fact that iron salts require an acid medium to be dissociated, which facilitates absorption. The explanation, according to Robson and Keele (*loc. cit.*) is that the negative effect of achlorhydria on iron absorption from the stomach will be felt much more when the small amounts of food iron are concerned than with the relative large doses of medicinal iron.

Prophylaxis

Having considered various aspects of hookworm anæmia, a condition which is not only of great medical interest but also of a tremendous economic importance, we have to deal with prevention of hookworm infection so as to avoid the development of hookworm disease; these two conditions have to be separated from the point of view of public health, a merely infected population being able to work efficiently whereas a sufferer from hookworm disease is seriously ill, requires hospitalization and is economically a liability.

Prevention is a target which before the last war has swallowed millions of dollars of the Rockefeller Foundation without much lasting effect because the basic conditons, social, economic and sanitary, have not even started changing. Infected persons, promiscuous defæcation close to coolie lines or primitive villages, sandy loam or coarse black humus, heat and an annual rainfall of at least 40 inches are the suitable conditions for the development and spreading of hookworm disease, provided susceptible people's bare soles are coming in contact with the soil that contains hookworm larvæ; moreover, food deficient in protein and vitamins favours the transition from worm infection to illness. Most of these conditions are fulfilled almost anywhere in India.

Scrutinizing these conditions point by point, we find that a very few infected persons are able to contaminate a large area, a single ankylostoma female passing 10,000 to 30,000 ova a day; this goes on for one to three years, the usual duration of the reproductive life span of the hookworm, by the end of which almost all the worms have disappeared from the intestines of the host, provided no new infection has taken place.

Promiscuous defæcation and the insanitary condition in a typical Indian village or in coolie lines are closely linked. If it were possible to provide latrines which are not repulsive, due to dirt, smell etc., and if every one would use them as a matter of course, the task of preventing further spreading of worm infestation could be solved. The bore-hole latrine has been acclaimed as the answer to the problem and theoretically it is quite effective; but the inexplicable tendency of our poorer classes to soil even a flush commode in a few days so as to render it unusable makes it very doubtful whether the population will take to using latrines rather than continue polluting the soil next to their living quarters as they do now. But this is not the only difficulty. The scarcity of animal manure and

the costliness of chemical fertilizers make it unavoidable that our peasant, just like his Chinese counterpart, uses human fæces on a large scale. If the nightsoil could be kept for about six week in a septic tank, ova and larvæ would be destroyed and it could be handled safely. At present, however, it is used without "preparatory treatment," spread over the fields, and worked in with bare feet, a nightmare of man-made conditions, spreading infection or securing re-infection after "successful" anthelmintic treatment.

To tackle the hookworm problem from the sanitary source from the side of nightsoil disposal, two tremendous tasks have to be fulfilled; the one is construction of millions of latrines, teaching people to use them regularly and without exception, and to keep them clean, the other to provide manure other than human night soil or to educate the agricultural masses not to touch it, in fact to consider it as poison, unless it was treated so as to destroy ova and larvæ. What a tremendous advantage the regular use of latrines would mean to our population is shown by recent investigations in the Jharia coalfields settlement area (Mukerji and Mathen, 1950); there the rate of hookworm infestation among latrine users was 6·8 per cent as against 42·8 per cent among those who preferred promiscuous defæcation.

Considering the natural factors which, of course, are entirely beyond our control, we find some essential differences between accepted text-book rules and our local experience in Rajasthan. Maplestone and Mukerji (1939) categorically state that "any area that has a minimum night temperature below 50 degrees for a considerable portion of the year does not have much infection". The minimum temperature of Jaipur, 11 years (Hendley, 1895), is 35°F in January, 34·8 in February, 49·4 in October, 42·2 in November and 34·5 in December. Such a low minimum temperature for five months a year should be sufficient to prevent the development of "much infection" and yet, at the Annual Meetings of the Jaipur Branch, Indian Medical Association, in March, 1949 and April, 1950, we demonstrated 10 and 14 cases respectively, of severe hookworm disease which were in our unit of 110 beds by routine admission, not by careful selection. Napier's (1946) statement that hookworm infection does not take place while the night temperature falls below 50°F is not borne out by our experience. We do not know for certain when our patients have acquired the infection; history of ground itch at the time of larval penetration of the skin, or of cough at the time when the larvæ enter the bronchial tree can never be elicited.

Another point of difference in epidemiological experience concerns the amount of rainfall required for heavy hookworm breeding. Chandler (1927) found that 6 inches of rain per month was usually necessary to insure large scale hatching of ova. Maplestone and Mukerji (*loc. cit.*) reduced these requirements to 40 inches a year and Napier (*loc. cit.*) asks for "a warm humid climate (or micro-climate)." Now, our annual average is 24 inches which is rarely reached and never exceeded and yet, the hookworms are thriving unimpeded by the well-known dry heat which is prevalent here.

It should be mentioned that more than 90 per cent of our ankylostomiasis cases are local farmers, or local agricultural labourers, living for generations in this area, mostly at the same spot. So the question does not arise of recent introduction by labour migration from tunnel construction, mines etc., as it happened in Europe after the Gotthard tunnel had been completed, in 1882.

The last point, and one with which we are in full agreement, is the presence of "a population that is largely barefooted in the hot months of the year, at least, and is susceptible to infection" (Napier, *loc. cit.*) We have little doubt that practically all our cases have been infected through the skin, mostly of their feet, although in some the larvæ might have preferred to dig way through the skin of the hands, as in the classical case of Arthur Looss, the ingenious discoverer of percutaneous ankylostoma infection (1898). This will happen particularly during weeding operations or removing of stones from the fields, occupations which bring the hands in close contact with contaminated soil. By far the majority of infections, however, is acquired through bare feet and this seems to me the starting point of any large scale anti-hookworm-campaign. Mukerji and Mathem (*loc. cit.*) found that wearing of footwear reduced the infection rate from 43 per cent to 27 per cent. The Public Health Department, Uttar Pradesh, is using ten different posters to inform the masses about means of hookworm prophylaxis, and their main points are: build lavatories and use footwear. About the applicability of the former measure I have expressed my doubts before, but the importance and practicability of the latter is beyond any doubt. As almost every adult in our local population has got some leather foot-wear, it should be possible to achieve through suitable propaganda some success by making them wear it regularly.

Treatment

Whatever prophylactic attempts might achieve in the future, many millions are suffering from hookworm disease now and still many more are carriers of hookworms; both groups require treatment, for their own sake and for the sake of the community. The benefit to the individual patient is obvious. The following facts and figures, quoted by Maplestone and Mukerji (*loc. cit.*) illustrate the significance of mass worm destruction for efficiency and resistance of whole communities. In Costa Rica, 66 labourers before treatment cultivated 563 acres of coffee per month, after treatment 750 acres, resulting in a wage increase of 27 per cent inspite of a 15 per cent general cut. In the Siamese army, of 99 hookworm infested soldiers, 69 were treated and gained

an average of 10·6 lbs. in weight while the corresponding figure for the untreated 30 was 1·1 lbs. In Porto Rico, 10 years of systematic deworming raised the average hæmoglobin percentage from 43 to 72. In Sumatra, the percentage of coolies with a hæmoglobin index from 75 to 100, increased from 35 to 88 in 3 years of hookworm treatment, and the number of those showing less than 30 per cent decreased by 20 per cent.

In Ceylon, during the influenza epidemic of 1918, 111 people or 7·5 per thousand died among 14,659 previously treated for ankylostomiasis, whereas of 3,252 untreated ones, the number of deaths was 43 or 13·5 thousand. In the tea gardens of Darjeeling absenteeism was reduced to about one half after hookworm destruction.

The course of treatment is fairly simple ; it consists in first building up the patient for deworming so that toxic by-effects of the anthelmintic drug will be reduced to a minimum and then, the destruction of the hookworms. The preparation aims at stimulating blood regeneration to a minimum level of 30 per cent hæmoglobin (Sahli), the dividing line between danger and safety zone when a more toxic anthelmintic such as carbontetrachloride has to be used. Ferrous salts are fully effective in hookworm anæmia, provided sufficient doses are used. Ferrous sulphate from 18 to 27 grains a day, divided in 3 doses of 6 to 9 grains each, taken on full stomach, according to our 10 years experience is the treatment of choice and so cheap that it can be carried out on a mass scale. From the usual hæmoglobin level of 10 to 12 per cent shown by our patients on admission, it takes about 20 days to bring it up to 30. Along with iron, we are giving crude liver as a routine treatment because it is the most reliable way to fight the vitamin B.-complex deficiency which is a common feature of most of our patients, not only of those suffering from hookworm disease.

As soon as a hæmoglobin percentage of 30 has been reached, deworming is carried out. The drug of choice is tetrachlorethylene which combines maximum effectiveness with minimum toxicity, although it causes occasionally giddiness, nausea or palpitation, which proves that it should be used only after properly building up the patient. Following the accepted routine we are giving at bed time one ounce of a saturated sodium sulphate solution ; the next morning, on empty stomach, 3 cc. tetrachlorethylene (T. C. E.), preferably in gelatine capsules of 1 cc. each, such as are supplied under the name Tetracap, B. W., followed two hours later again by one ounce of sod. sulph. If Tetracap is not available, 3 to 4 cc. of the oily liquid are shaken up vigorously in a stoppered bottle with 2 ounces sod. sulph. and taken before the emulsion had time to settle. The effect of one course is said to be complete in 90 to 95 per cent of cases. In our own experience, a great deal depends on the brand used ; with Tetracap repeated courses are required only in heavy infections while other preparations are by far less effective. We have hardly seen a case who required more than two courses of 3 cc. Tetracap each, repeated in weekly intervals, to become completely free of worms.

In Mysore, we used exclusive carbontetrachloride (C.T.C.) which, inspite of its bad reputation as a liver poison, proved almost equally safe and effective, provided some precautions were taken regularly. Iron therapy until a hæmoglobin level of 30 per cent has been built up ; absolute abstention from alcohol for at least one week before and one month after C.T.C. ; a course of 3-5 intravenous injections of calcium gluconate, one every day, just prior to C.T.C., and rest in bed on the day of treatment. The dosage we recommend is C.T.C., 30 to 45 minims, divided in two to three doses, given within one hour on empty stomach and followed after 3 to 4 hours by one ounce of saturated sodium or magnesium sulphate. Food is withheld until a good bowel movement took place. To use any of the older anthelmintics, particularly thymol which is still retained in many hospital pharmacopœias is absolutely useless, a sheer waste of time and money. The traditional addition of oleum chenopodii to an effective anti-hookworm drug is justified only in places where ascaris infestation is widespread, as in Kashmir, or, of course, if ascaris ova have been found ; otherwise, it causes an unnecessary increase of toxicity which, especially, for the badly damaged hookworm heart is undesirable.

Summary

Starting with the report that Rajasthan is only slightly affected by hookworm infestation, it has been our experience that in Jaipur State, at least, ankylostomiasis is widespread and hookworm disease often very severe. It is shown how this condition should be suspected from certain features from the history and particularly from the appearance of the patient while the diagnosis can be definitely established only by finding the ova.

Some problems of ankylostoma disease are discussed; foremost among them is anæmia, with its treatment, response to iron and the conditions which make it iron-refractory. The importance of intravenous iron therapy in some cases is outlined.

The nature and the signs of the "hookworm heart" are described in some detail.

The question whether a hookworm toxin exists is reviewed.

It is pointed out that the gastric function is independent of the blood condition and the response to iron independent of the degree of gastric acidity.

Hookworm prophylaxis is discussed and it is concluded that considering the difficulties of building latrines on a nationwide scale and teaching the masses to use them properly, strict avoidance of walking barefoot gives the best protection against infection.

Treatment is discussed from the point of view of first building up the patient so that he will stand

deworming without suffering any harm, and secondly regarding selection and application of the most effective anthelmintic drugs.

REFERENCES

CHANDLER, A. C.—*Indian J. Med. Res.*, 15: 159, 1927.
HEILIG, R.—*Indian M. Gaz.*, 76: 519, 1941.
Idem—Ibid., 77: 257, 1942.
HEILIG, R. AND VISVESWAR, S. K.—*Indian Physician*, 1: 359, 1942a.
Idem—J. Trop. Med. & Hyg., 45: 113, 1942b.
Idem—Indian M. Gaz., 77: 385, 1942c.
Idem—Ibid., 78: 578, 1943.
HENDLEY, T. H.—A Medico-Topographical Account of Jeypore. Calcutta Central Press Co., Calcutta, 1895.
KHARE, S. B.—*Indian J. Med. Sci.*, 5: 6, 1951.
LOOSS, A.—*Centralbl. Bakt. Abt. I*, 24: 441, 1898.
MAPLESTONE, P. A. AND MUKERJI, K. K.—*Heath Bull.* No. 1. Manager of Publications, Delhi, 1939.
MUKERJI, A. K., AND MATHEN, K. K.—*Indian J. M. Research* 38: 95, 1950.
NAPIER, L. E.—The Principles and Practice of Tropical Medicine. MacMillan & Co., New York, 1946.
NAPIER, L. E., DAS GUPTA, C. R., AND MAJUMDAR, D. N.—*Indian M. Gaz.*, 76: 1, 1941.
ROBSON, J. M., AND KEELE, C. A.—Recent Advances in Pharmacology, J. & A. Churchill Ltd., London, 1951.
SIMMONS, J. S., WHAYNE, T. F., ANDERSON, G. W., AND HORACK, H. M.—*Global Epidemiology*, Vol. 1, p. 120. J. B. Lippincott Co., Philadelphia, 1944.

PUBLIC HEALTH

ROLE OF THE GENERAL PRACTITIONER IN PREVENTION OF DISEASES*

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WAR ON DISEASE

A successful war on disease demands a total mobilisation of our resources, a well co-ordinated integrated plan of offensive and a united strong general staff to direct the operations.

But what do we find to-day? (1) The medical army is divided into two independent divisions—the medical and health departments with little co-operation and co-ordination between them. There is diarchy in this medical army. There is no unified general staff.

(2) There are isolated battles but no all-out attack on disease. The energy of the bulk of this army is concentrated on the curative aspect almost to the exclusion of the preventive side. The general practitioners who constitute this section are only concerned with a clinical cure. Activities such as detecting the patient in the incubation period, tracing the source and reservoirs of infection, detection of carriers, blocking the channels of spread and creating environmental conditions unsuitable for spread of disease, do not come within the range of this major portion of the medical army. This section is concerned with individual health and ignores the more important aspect of public health. The activities of the general practitioners are restricted by the commercial nature of private practice and are not shaped according to the needs of the people. The other division of the army which is concerned with public health is poor in strength. The wise old often repeated maxim "Prevention is better than cure" is ignored in the constitution of our medical army and insufficient. This section which deals with public health has insufficient contact with the medical practitioners. Hence it is handicapped in its work. The health department is content with devising temporary expedients, like meeting epidemics and is mainly engaged in general sanitary measures, like looking after water supply, drainage, disposal of refuse etc. in urban areas. Its activities are only isolated patchwork measures.

(3) The divorce between the two sections of our medical army has disrupted the fighting strength and morale of either section. The private practitioner who is so engrossed in the paying curative side, ignores even such elementary preventive duties such as notification, disinfection and immunisation. He takes no active interest in environmental hygiene. The health worker on the preventive side loses contact with the living aspect of clinical medicine. Having inadequate contact with the people he cannot win their confidence and is forced to rely on his authority. In course of time he degenerates into a mere administrative head.

The war on disease has thus been weakened by the diarchy and lack of an integrated plan for offensive and lack of co-ordination in the medical army. War on disease cannot be won by isolated skirmishes. It demands an all out attack.

MEDICAL ARMY—ITS EVOLUTION AND DIFFERENTIATION —THE CHANGING ROLE OF THE GENERAL PRACTITIONER

A historical study of the changing role of the medical practitioner in relation to social change and evolutionary growth of medicine is essential for a proper understanding of the causes that have led us to the present unsatisfactory situation.

Prevention of disease was an integral part of treatment in ancient world and during the middle ages. Medical practitioners practised prevention as part of treatment. Divorce between prevention and cure arose at a later stage as a historical necessity. But later it has become an impediment to further progress and today reintegration of prevention and cure has become a historical necessity.

Ancient Period—In ancient days knowledge regarding disease was based on traditional beliefs, superstition and religion. "Diseases were classified as supernatural, human and subnatural". Priestcraft

* Dr. P. Gurumurti Prize Essay.

dealt with the former, trying to propitiate the gods, while magic and witchcraft controlled the latter two. This was the beginning of medicine.

Middle Ages—Towards the end of pre-christian era, Hippocrates, father of modern medicine rescued medicine from the clutches of magic and witchcraft and laid a rational foundation for its subsequent development. The concept of disease as due to "miasmata and toxic vapours", although unscientific, resulted in improvement of sanitation. Man began to despise dirt and filth as the source of disease. In the middle ages medicine grew under state patronage, largely as a measure of charity. Free enterprise did not flourish in medicine. Medical science stagnated, during the latter part of this period.

Modern Period—Industrial revolution led to unprecedented technological advance. The social upheavals and breakup of feudalism resulted in a free trading community, and a growth of towns.

Industrial revolution and technological progress—Its effect on growth of Medicine—The discovery of the microscope by Leeuwenhoeck was the result of this technological advance. It opened new horizons. *The world of bacteria became visible and a new dynamic concept of disease arose.* Pasteur, Koch and other workers established beyond doubt the bacterial origin of a large number of diseases. They showed disease as a biological process spreading from man to man. Recognition of etiological agent now became all important in the study of disease. Its source, reservoirs, modes of spread, path traversed were recognised as important aspects of study of disease. Forces of infection poised against the resistance offered by the body were recognised as conditioning a spectrum, a portion of which reveals clinically nonrecognisable disease represented by missed cases and carriers who escaped detection before the discovery of the microscope.

Break up of Feudalism—Origin of free enterprise—Growth of towns—its effect on the Medical Profession—Break up of feudalism resulted in a new social set-up with the free trading community as its backbone. Medical profession quickly adapted itself to changes in social set-up. Medical practitioner's customers grew up as also his volume of work. Free trading in medicine began. Medicine became a service purchased by the patient and sold by the physician under a competitive system.

With the growth of urban areas, problems of sanitation cropped up. The successive epidemics of plague that decimated the population of the city of London in the middle ages and the famous reports of Sir Edwin Chadwick in the 19th century led to State intervention for the first time and setting up of public water supply and sewage disposal. Thus arose the public health department and with it the medical officer of health who specialised only in the prevention of disease.

Separation of prevention and cure—once a necessity now an anachronism. Reintegration a historical necessity and an urgent need for scientific progress—This development in medicine soon became disastrous. Although it was quite necessary in the early stage, such a watertight division between the preventive and curative branches of medicine neither allowed their full growth nor served the expanding needs of the public.

The second harmful feature resulting from the divorce between prevention and cure is, concentration on curing the individual only, losing the preventive perspective. The general practitioner working under a competitive system, tries to hold his patient and satisfy him within definite financial limits. A cure only is aimed at under the circumstances. Because eradication of disease demands that he should contact his patient long before the disease is contracted and continue the treatment long after the apparent clinical cure, to ensure that the focus of infection is thoroughly neutralised and cannot spread further. But this is clearly impossible within the business contract entered upon between the doctor and the patient. Moreover, in a society where profit motive is one the important factors which determine production, the practitioner cannot be expected to engage himself in preventive work which does not yield an immediate cash return. He is not paid for looking after health. He is only paid for curing disease. Thus, medicine became as much a trade as any other and the general practitioner, in the words of Shaw, got into "a precarious shabby, genteel, irresponsible, servile position based wholly on the prevalence of illness".

Carriers and missed cases confound both the general practitioner, who cannot with certainty proclaim freedom from disease and the medical officer of health who cannot stamp out with confidence any prevalent epidemic. The electron microscope and advances in pathology have led to discovery of obscure etiological agents and opened new fields of medical entomology. The fight against prevention attained new heights leaving the simple problems of environmental sanitation to the public health engineer who succeeded in stamping out waterborne epidemics. Development of personal medical services received more attention. Fight against 'Social' diseases like tuberculosis, leprosy, and venereal diseases has been taken up. A successful campaign against all these diseases cannot be waged by prevention alone, isolated from the curative branch, nor, the curative branch alone is capable of tackling the problem completely. For example, an early case of tuberculosis can certainly be cured while it becomes fatal if progressive. Some diseases are best treated in the preventive stage itself, for example, microfilaria in filariasis. Who does not know the dangerous potentialities of *treponema pallidum* which perpetrates havoc before its existence is recognised.

Like siamese twins prevention and cure have become inseparable and the present watertight division

must necessarily arrest their further progress. The growing needs of the public surely cannot be satisfactorily served in such a situation.

But how can the reintegration be achieved? What shall be our new strategy?

Reorientation of Strategy—A Study of Contemporary Experiment

The conservative approach—a compromise solution—In American and, till recently, in England, the conservative approach was adopted. Charity by the State was combined with the trade by private medical practitioners. "State medicine, insurance medicine, charity and private medicine all existed together. The fight against disease is not led by one general staff but a multitude of staffs among which there is very little co-operation and no leadership at all. It is obvious that these systems have all deficiencies of a compromise". The lack of co-ordination among various branches, for example, was keenly felt by Pandit Nehru addressing the Third Health Ministers' Conference recently when he said "now I have laid stress on two matters, food and housing which we consider as basic to health. These are not nominal within your reach and probably you will not consider them." Thus the fight against disease in general and prevention in particular is relegated to the background. The private practitioner rests content with at best neutralising the patient, as a further source of infection leaving the rest of preventive aspect to the Public Health Department. Though this system developed in America, a country abounding with plentiful resources, it must be admitted as wasteful.

The Progressive Approach—Socialist Solution—The U.S.S.R. and now England are trying the progressive method. Here medicine like education ceases to be a trade, and becomes a public function of the society. The formal distinction between prevention and cure is abolished and there is co-ordination of all the State Departments in working the health programme.

Free enterprise with profit motive is eliminated and a clean break with individual treatment achieved. New conception of positive health prevailed giving rise to an organisation, where "the general intent is to supervise the human being medically in a discrete unobtrusive way from the moment of conception to the moment of death and medical workers and medical institutions are placed where any one in the course of his life may be exposed to danger.

The fact that England having worked the compromise solution all along, changed her outlook and socialised her health service is in itself a convincing proof of the soundness and correctness of this solution. Shaw long ago said "the social solution to medical problem depends on that large, slowly advancing pettishly resisted integration of society called socialism." England has now realised the wisdom of these words.

In our country Pandit Nehru appreciated this change in the outlook of medicine "which some hundreds of years ago was largely content with what might be called individual treatment" and admitted that individual aspect form the states' point of view is infinitely less important than the other aspects of importance, public health, sanitation etc. He also realised the futility of caring for individual health as against public health. It is hoped that the worthy Prime Minister will soon translate his ideas into action.

Army Medicine—A close approach to socialist medicine—It may be difficult to visualise socialist medicine. But a nearer illustration is the army medicine. The army medicine approaches the ideal of socialist medicine in a rather close manner and much may be learnt from it. The fact that ill health has been free from financial anxiety arising from the cost of treatment is a matter of great medical importance. Secondly, prevention and cure are combined in the duties of regimental medical officer. Thirdly, specialist medical services are made available and team work among medical men encouraged. Results of these changes are significant. Health of recruits improves rapidly. Incidence of ingestive type of diseases is very little. Lastly, army medicine is easily practicable The regimental medical officer can be compared to our general practitioner but with one essential difference that he is a full-time paid servant and not subject to the hardships of private practice.

Strategy Suited to our Soil and Needs—Role of General Practitioners in this Strategy

Ayurveda according to Charaka is the "science and art of living a happy long life in a manner useful to society". It has for its object "Preservation of health in the healthy and restoration of health to the diseased (Sushruta). Ayurveda had this positive integrated outlook on health and did not separate prevention and cure. Ayurveda in ancient days did not exist as a trade but flourished under state patronage.

"Our villages are abounding in a half-starved population stricken with disease arrested in development and increasing at a rate far in excess of the standards of living necessary for a healthy existence". State medical aid is woefully inadequate. The health department is poor in strength and resources. It is only trying "to patch up by measures wholly inadequate, the health conditions of the people in urban and local areas, with the result that the money thus expended had not materially advanced the health of the people". The country is faced with an unbroken chain of epidemics. Ill-health is not accidental but the rule. So continuous all-out war on disease has to be waged. An all-out mobilisation of all available medical practitioners, and auxiliary technical personnel is urgently needed, to make a concerted and frontal attack against disease. Nationalisation

of medicine must be done immediately and people must be assured of the state health service and medical aid, irrespective of their paying capacity. Under this system private practice ceases to exist and with it the general practitioner. He will be transformed into a disciplined well-trained soldier employed in a well-knit medical army carrying out both preventive and curative tasks.

The Bhore Committee, after an exhaustive survey of health conditions, resources, and needs of our country, recommended integration of preventive and curative services and starting combined health centres in the village, taluk and district centres linked with each other. In their conception the general practitioner should tackle both preventive and curative aspects of disease.

Till this transformation takes place the general practitioner still plays a decisive role. He has to consciously reorient his attack against disease from a preventive angle, and supplement the health services in eradicating disease from the patient and his surroundings. He must offer his co-operation to the health department and give constructive suggestions to them regarding the health needs of the area where he lives and works. He has to play an active part in preventing the spread of infectious diseases. He must educate his patients and attendants in preventive tasks such as disinfection etc., and principles of hygiene. He should advise them on dietetics, give concrete suggestions to them on domestic hygiene. He must periodically examine the members of families under his care. He has to play an important role in the school medical inspection, maternity and child welfare services, in the campaign against social diseases like tuberculosis, leprosy and venereal diseases. Finally, his personal hygiene and the sanitary conditions of his dispensary must be such as to serve as an example. There must be a health museum attached to his clinic. He should interest himself in all problems concerning the people, including their diet, housing, customs, ideas etc., in so far as they have a bearing on people's health. In short he has to be a physician, sanitarian, social worker, humanitarian, put together and with a missionary zeal and fanatic's enthusiasm he must undertake the task of restoration of the nation's health. It is a hard work but the interests of the nation demand it.

SUMMARY

Prevention of disease was an integral part of the treatment in ancient days, as illustrated in Ayurveda; but gradually the medical practitioner became divorced from the preventive responsibility. The separation became complete with the development of State public health service, which was a historical necessity due to the growth of urban areas. Isolated prevention is only wasteful, and isolated cure became quackery; eradication of disease was neglected and the noble "medical profession became a vested interest in ill-health." Other countries worked out compromise and revolutionary solutions to the problem, of which the latter was found to be more satisfactory as evidenced by England's example and the Army medicine nearer at hand. Problems of state medical and public health services and of the private practitioners in our country along with Bhore Committee's proposals, were discussed and until the dawn of Nationalised Health Services, an impassioned plea made to the general medical practitioner to reorient his attack on disease, from the preventive angle as well, underlining his role in various preventive diseases, which are major health problems. He is urged to fall into the all-in mobilisation to make an all-out attack against our major enemy —ill-health.*

* The writer suggests nationalisation of Health Services, with the introduction of which he expects private practice would come to an end; but before the transformation comes, he asks the general practitioner, who plays a decisive role in the development of national health, to transform and reorient himself in a number of ways so as to be of help to the Public Health workers and to the people. If the general practitioner is to be left entirely on his own to eke out a living, one wonders how he could be expected to attend to the long list of duties the writer has enumerated. Practical suggestions as to how this could be achieved pending nationalisation of Health Services are wanting. The article is of academic value—*Ed., J. Indian M. A.*

CASE NOTES

BLASTOMYCOSIS OF LUNGS

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M. SIRSI, M.B.B.S., VALI NAZIR AHMED, L.M.P.,
AND
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R. M. S., Muslim, male, aged 60 years, resident of Bangalore—a butcher by profession, was seen on 4-10-1950, complaining of dyspnœa, oppression in the chest and cough since two years. There was no significant family history or previous history.

History of present illness—The dyspnœa was noticed two years back. In the early stages it was evident only on exertion. Recently the patient has dyspnœa even at rest. Cough is occasional and not characteristic.

Physical findings—The patient is a tall, well-built man showing early signs of cachexia. His mucous membranes were slightly pale. Lips were not cyanosed. Tips of fingers showed a tendency for clubbing. Toes not clubbed. No œdema any where. Skin and subcutaneous tissue—no lesion except a patch of eczema over the right elbow on both volar and dorsal aspects. Other systems—no abnormality. Pulse —regular, 108 per minute, of good volume and normal tension. Heart—no abnormality. Mouth temperature—98°·6 F. Respiration—30 per minute and regular.

Chest—Wasting over both infraclavicular regions. Movements equal on both sides. Percussion—slightly hyperresonant

all over. Auscultation—breath sounds vesicular, heard all over, but distant over an area over right base. No adventitious sounds. V.F. and V.R.—unaltered. In short, no significant positive signs.

Shiagram—Multiple opacities distributed uniformly over both lung fields (Fig. 1, *vide* Plate), size varying from 0·25 cm. to 1·5 c.m. Shape variable, irregularly oval or circular. Edges—well seen but not sharp, intervening lung tissue healthy. Diaphragm moves well and equally on screening. Costo- and cardiophrenic angles free. Heart—normal.

Laboratory findings—The sputum was collected in a sterile flask after thoroughly rinsing the mouth with an antiseptic gargle and was tested within an hour.

NAKED EYE: It was semi-solid and slightly mucoid.

DIRECT MICROSCOPY: A few scattered red blood corpuscles, leucocytes mostly polymorphs and a few large spherical cells with a thick refractile wall which aroused the suspicion of a fungal infection. The sputum was mounted in a drop of 10 per cent KOH, cover glass put on, and the preparation was heated gently over a Bunsen burner's low flame and examined under subdued light from the condenser. The illustration (Fig. 2) indicates the types of spherical cells seen in the KOH preparation of sputum.

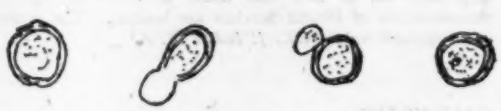

FIG. 2

Single and budding, spherical and slightly ovoid cells about 10—15μ in diameter with thick, refractile walls, dispensed singly or in a few clumps were found distributed all over the microscopic field. The thick wall gave a double contour appearance to some of the cells. No mycelia were seen.

Stained smear: No acid-fast bacilli present. Secondary organisms—staphylococci and long-chained streptococci present.

Culture: The sputum was cultured on blood agar and Sabouraud's glucose-agar media. The blood-agar was incubated at 37°C. and the Sabouraud's at room temperature. Staphylococci aureus, strepto. B haemolyticus and a few wrinkled, waxy colonies, composed of budding, yeast-like cells, similar to the ones seen in sputum were grown.

A direct examination of another fresh sputum specimen a few days later also showed similar spherical cells with a tendency towards budding.

As it was expected that a bronchoscopic specimen of the sputum, would be available further investigations of the fungus was not done but unfortunately the patient refused further co-operation.

Urine—N.A.D.

Kahn test—Negative.

Blood pressure—125 mm. Hg. systolic, 86 mm. Hg. diastolic.

Blood sedimentation rate—½ hr.—7 mm. (Westergren's) 1 hr.—21 mm. (normal one hour—2-10 mm.).

Hb.—60%

BLOOD COUNTS:

	11-10-50	9-11-50	30-11-50
		After deep X-ray	
Polymorphs	57	67	80
Lymphocytes	25	24	10
Eosinophils	12	9	6
Large mono	5	—	4
Basophils	1	—	—
Total WBC. ...	6,300	—	3,490

DIFFERENTIAL DIAGNOSIS was considered from disseminated tuberculosis and secondaries in the lungs. A thorough search of the body including that of the prostate gland did not reveal any malignancy.

TREATMENT: Injections of dihydrostreptomycin ½ gm per day was given for a total of 12 gm., without benefit. Deep x-ray therapy was started. 100 r. units per day were given from 13-11-50 to 2-12-50. Total dose was 1,800 r. units. Alternating anteroposterior and posteroanterior exposures were given over chest. The patient felt slightly better after the third exposure. Symptomatic treatment was given without relief.

PROGRESS: The patient complained of weakness and burning sensation all over the body, one month after the completion of deep x-ray therapy. He went downhill and died on 17th January 1951, four months after being first seen by us. In the later stages he refused all treatment. Autopsy was not permitted.

DISCUSSION

Complete confirmation was not possible because of two reasons. (1) The patient did not co-operate as our treatment was not of any avail. (2) The physicians did not realise the rarity of the disease early enough. The budding spherical cells, with their double contoured thick refractile walls, seen in the sputum and the limited observations on the cultural growth indicate the infection to be probably one of blastomyces. Of late, it is being recognised that fungal infections both systemic and cutaneous are not a rarity in India (Andleigh, 1951a). A few cases of blastomyces have been recently reported (Andleigh, 1951) and it would cause no wonder if a more systematic radiological and cultural examination were to bring forth the presence of a wide range of mycotic infections. We are in full agreement with the following statement. "Fungal infections are of such common occurrence that we have found it necessary to consider mycotic diseases in the differential diagnosis of practically every obscure infection" (Kirk, 1946). We would be acting rather wisely if we suspect mycotic infection of the lung in every case with a chronic cough and irregular fever specially in the presumptive case of tuberculosis with a negative sputum (Andleigh, 1951b).

PATHOLOGY: In medical literature the term blastomycosis has been used very loosely to designate etiologically diverse infections in which budding cells are found in the tissues. Primary infection is most common in skin. Primary infection of lung is not

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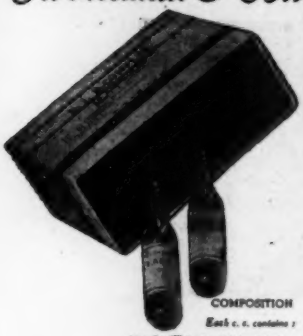

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uncommon and resembles pulmonary tuberculosis clinically with cough, pain in chest, sometimes hæmoptysis and productive sputum late in the disease. Focal or diffuse consolidation, miliary abscesses or larger nodules occur. Cavitation occurs but is limited to small areas. Microscopically the lesion is similar to that of tuberculosis except for the presence of budding cells. Generalisation occurs, producing hæmatogenous multiple small abscesses throughout the body especially in subcutaneous tissues, in various viscera muscles and under the periosteum. Septic febrile reaction occurs ending fatally (Jordan and Burrows, 1946).

SUMMARY

A case most probably of blastomycosis of lungs is described. Diagnosis is possible only by radiology and culture of sputum, having in mind the possibility of mycotic infections.

REFERENCES

ANDLEIGH, A. S.—*Indian J. M. Sc.*, 5: 59, 1951.
Idem—Ibid, 5: 168, 1951a.
Idem—J. Indian M. A., 20: 368, 1951b.
JORDAN AND BURROWS—Text Book of Bacteriology, 1946.

ACTINOMYCOSIS OF THE LUNG

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As only a few cases of actinomycosis of the lung are recorded in the Indian literature, I thought it worthwhile to record the following case, though it was actually seen years ago when penicillin was not available.

CASE REPORT

Mr. R. V. M., aged 45, hindu, male, was admitted for cough, sticky expectoration and swelling over the right side of the chest of two months' duration.

Previous history—Dysentery at the age of 37 which lasted for 3 months. Habits—Non-vegetarian; drinks alcohol Family history—nothing relevant.

History of present illness—Present complaint started about 2 months ago with a feeling of startling pain in the region of the liver and this subsided in about 10 days' time Later, he could not lie on the right side. Later he developed a sense of suffocation. From this time onwards, he had cough with sticky expectoration. About 10 days ago, patient noticed a painful swelling on the right side of the sternum.

General condition—Fairly nourished man of about 47 years. Moderately anæmic, not cyanosed or jaundiced. Marked clubbing of the fingers. Teeth clean. Few inguinal glands palpable. Soft fluctuating swellings over the lower and outer part of the sternum were present and there was another over the right costal margin (Fig. 1, *vide* Plate). The lower one was tender. Weight 112 lbs.

Cardiovascular system—Pulse rate 116 per minute, volume and tension being poor. Blood pressure 85/55 mm. of Hg. Heart boundaries normal and sounds feeble in all areas.

Respiratory system—The base of the right lung dull with feeble air entry and fine rales. Signs of compensatory emphysema in the upper part. Left lung normal.

Abdomen—Just palpable liver. No enlargement of the spleen. He was running a temperature ranging between 98°·4 and 100°F.

Laboratory reports—Blood: Kahn—Negative.

Sputum: By ordinary and concentration methods—Negative for tubercle bacilli, actinomycotic granules seen.

Pus aspirated from the swelling was like prune juice. Culture sterile. Actinomycosis seen. 14-7-41: R.B.C. 3·2 million. W.B.C.—12,000 per cmm. Hb—60 per cent.

X-ray chest: Opacity over the right base, irregular consolidation (Fig. 2, *vide* Plate).

On the medical side he had potassium iodide orally. On the surgical side, it was incised and drained and given Crookes colossol iodine intravenously upto 20 c.c. daily. Deep x-ray therapy also given.

The patient died of toxæmia though afebrile from the time of drainage, *i.e.*, a period of one month and 3 days prior to his death.

I am thankful to Dr. T. Satakopan under whose care the case was originally admitted and to the Surgeon-General with the Government of Madras for permitting me to record this case.

LAURENCE-MOON-BIEDL SYNDROME

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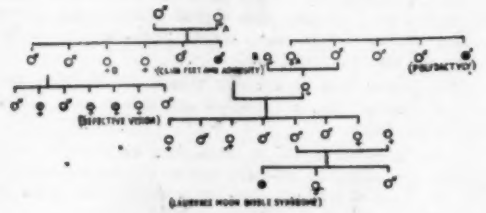
The following case of Laurence-Moon-Biedl Syndrome seen in the ophthalmic department, King George Hospital, Visakhapatnam may be of interest in view of its rarity.

P.V., aged 12 years, hindu, male, was admitted into the hospital on 7-6-50 for night blindness of 4 months duration, of defective vision of 5 months duration and of retarded mental development.

Family History—The parents are agriculturists and come from the district of Visakhapatnam. The father is 49 years and mother 30 years old and both are healthy having no physical or mental defect. They were not related to each other before marriage. The three children born to them are alive, the patient being the eldest. The patient's sister and brother, 7 and 3 years old respectively, are healthy and normally developed. Patient's paternal and maternal uncles and aunts are all said to be normal. The patient's grandfather had club-feet and adiposity and the general configuration of his body was very much like that of the patient; he lived upto the age of 50 and he had no other disability or defect. He married one who was both his cousin and niece (*i.e.*, one born to his maternal uncle and sister). The elder brother of this grand-father of the patient had one daughter

CASE REPORT

with defective vision who died in her 13th year. The exact nature of the defect in vision was not known. The paternal uncle of the patient's paternal grand-mother had polydactylism without any other obvious defect. This individual with polydactylism also happened to be the maternal uncle of the patient's paternal grand-father. On the mother's side of the patient there is no family history of the syndrome or any of the components. So the preponderance of the incidents of defects are noticed in the males (3 males compared to 1 female). Briefly the pedigree can be schematically represented as follows. The affected members are shown in black, the nature of their defects noted below within brackets ( ). A and B denote status before marriage and A' B' after marriage.



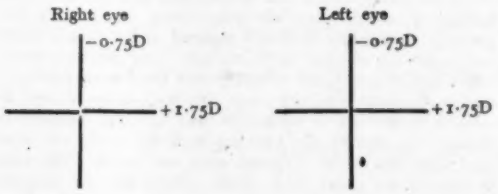
Birth and developmental history—The patient was born as a full term baby with 6 fingers on each hand and club feet; mother's pregnancy was uneventful and labour normal. The boy appeared to grow normally till about 3 years back when he was put to school he was found to be mentally backward. Since 5 months his acuity of vision has been found to be defective, and since 4 months he is not able to see well at night.

Examination of the patient on admission—PERSONALITY AND MENTAL CONDITION: He is of a lazy disposition, emotionally unstable and extremely forgetful. He has poor attention and cannot follow any instruction and is incapable of elementary reasoning. His mental development is that of a child of 3 years' age.

NERVOUS SYSTEM: *Cranial nerves*—1, 3, 4, 5, 6, 7, 9, 10, 11, 12 cranial nerves are all normal. Movements of the eye ball normal, no squint or nystagmus present; pupils normal in size and shape and reacting to light and accommodation.

8th Nerve: The patient's hearing was defective. His response, even making allowance for poor attention on his part, is demonstrably indicative of some hardness of hearing. Other motor and sensory nerves and all reflexes, superficial and deep, are normal.

Retinoscopy at 1 metre distance with a plane mirror showed:



RIGHT EYE VISION: COUNTING OF FINGERS AT 5 METRES.
LEFT EYE VISION: COUNTING OF FINGERS AT 5 METRES

Improvement with the correcting glasses could not be ascertained as the patient was unable to answer with any certainty or consistency.

Ophthalmoscopic appearance of the fundus and media: Both eyes are of the same appearance. Optic disc yellowish white in colour; blood vessels considerably narrowed; retina atrophic; sclerosis of the choroidal vessels present; black bone corpuscle like pigments scattered all over the fundus; media clear—fields of vision could not be recorded for want of co-operation on the part of the patient.

SKELETAL APPEARANCE AND BODY STRUCTURE: (Figs. 1 and 2). A short fat boy with plump face, of 3′ 7″ height

FIG. 1

FIG. 2

and 65 lbs. weight; not uniformly obese; adiposity gathered more about the loins, abdominal region and proximal part

of the lower extremities. He had no cranial deformity. He had lordosis of the lumbar spine, had extra digits on each hand on the ulnar aspect. He had talipes equinovarus of both the feet and hence his gait slow, ungainly and laboured; skin smooth in texture and normal; hair normally distributed; teeth 28 in number.

GENITALS: Both penis and scrotum underdeveloped in size and testes very small for his age though descended and present in the scrotum. Excess of fat about the loins and around the genital region.

GENERAL CONDITION: Not anæmic, well nourished, no evidence of any avitaminosis or any other stigmata, congenital or acquired.

CARDIOVASCULAR SYSTEM: Pulse regular, 70 per minute, of normal volume and tension and no other abnormality was noted.

RESPIRATORY SYSTEM: Respirations 20 per minute, regular and no other abnormality detected.

ALIMENTARY SYSTEM: No abnormality detected.

Laboratory findings—Blood Wassermann Reaction: It was negative.

Glucose Tolerance Test:

Fasting blood sugar—79·0 *mgm. per cent*

	Blood Sugar in mgm.%	*Urine sugar*
½ hour after giving 50 grams glucose	102·0	*negative*
1 hour after " " "	109·0	"
1½ hours after " " "	85·1	"
2 hours after " " "	77·5	"

This shows increased glucose tolerance. The test could not be conducted over 3 hours as the patient did not co-operate.

Urine: Total quantity for 24 hours could not be collected as patient sometimes passed urine in the bed. Specific gravity—1012; reaction—acid; clear, no sugar, no albumin.

Basal Metabolic Rate:—If was minus 10·9%.

COMMENT

The case under report shows all the characteristics of a complete syndrome of Laurence-Moon Biedl, *viz.*,

(1) obesity,
(2) genital dystrophy,
(3) retinitis pigmentosa,
(4) polydactylism,
(5) mental deficiency, and
(6) familial occurrence.

The presence of the first 5 signs of the syndrome is obvious from the clinical findings of the case as noted above; as for the evidence of familial occurrence of the complete syndrome it is not conclusive from family history. The occurrence of the syndrome in an incomplete form or as individual signs comprising the syndrome was undoubtedly present in some of the ascendants, and their collaterals of the patient's family, in the course of three previous generations.

SUMMARY AND CONCLUSION

(1) One more case of Laurence-Moon-Biedl syndrome is reported from King George Hospital, Visakhapatnam. The case is a complete picture of the syndrome as are the cases presented before with retinitis, polydactylism, obesity, genital dystrophy, mental deficiency and a highly suggestive familial occurrence and besides these the involvement of the 8th cranial nerve and the deformity of talipes equinovarus.

(2) The preponderance of the affected males is in conformity with the sex ratio reported by other authors.

(3) Consanguinity of an extreme degree present in the ascendants of the case again testify to the recessive nature of the inheritance.

REFERENCES

BARDET, C.—Quoted by Cockayne *et al.*

BIEDL, A.—Quoted by Jenkins and Poncher.

BURN, R. A.—*Brit. J. Ophthal*, 34: 1950.

COCKAYNE, E. A., KRESTIN, D. AND SORSBY, A.—*Quart. J. Med.* N. S., 4: 93-120, 1935.

ELWYN, H.—Diseases of the Retina J. and A. Churchill Ltd.

JENKINS, R. L. AND PONCHER, H. G.—*Am. J. Dis. Child.*, 50: 178, 1935.

KUTUMBIAH, P. AND ABBU, C.—*Indian J. of Pediat.*, 9: 120, 1942.

LAURENCE, J.-Z. AND MOON, R. C.—*Brit. Ophth. Rev.*, 2: 32, 1866.

MUTHAYYA, R. E. S. AND IYER, T. R. V.—*Madras M. J.*, 4: 260-61, 1939.

RAAB, W.—Quoted by Jenkins and Poncher.

REILLY, W. A. AND LISSER, H.—*Endocrinology*, 16: 337, 1932.

SOLIS-COHEN, S. AND WEISS, E.—*Am. J. M. Sci.*, 169: 489, 1925.

SORSBY, A. AVERY, H. AND COCKAYNE, E. A.—*Quart. J. Med.* N. S., 8: 51-68, 1939.

RIEGER AND TRAUNER—Quoted by Cockayne *et al.*

VAN BOGAERT, L. AND BORREMANS, P.—Quoted by Sorsby *et al.*

N.B.—Since writing this article we received a private communication of two case reports of this syndrome by Dr. K. Someswararao, Nutrition Research Laboratories, Coonoor, S. India (under publication).*

* The article has already been published (*Indian M. Gaz.*), 85: 502, 1950. ED.,—*J. Indian M. A.*

JOURNAL OF THE

INDIAN MEDICAL ASSOCIATION

CALCUTTA, MAY, 1952

INDUSTRIAL HEALTH

The idea of introducing health insurance scheme in this country originated as early as 1923. But practical shape could not be given to it so long for some reason or other. During the second World War when industries in India were asked to make all-out efforts to produce more to meet the growing demand of various kinds of finished products, the authorities took up in all seriousness, the question of improving the condition of health of the workers engaged in the various industries of this country. In 1943 Prof. Adarkar was entrusted with the task of examining the question and to evolve a beneficial scheme concerning the health and living conditions of workers. He submitted a voluminous report whose various phases were scrutinised by the Industries and Labour Departments of the Government of India.

After the termination of the war, the Government of India introduced as a post-war development scheme for the promotion of better conditions of the industrial workers, the Workman's State Insurance Bill in the Central Legislature in 1946. This was passed in 1948 as the Employee's State Insurance Act. But the implementation of the scheme was delayed till 1952. This unusual delay has been explained as due to administrative difficulties. But it is whispered that one party or the other involved in the scheme was not agreeable to his share of financial responsibilities as arranged in this scheme. But that is not the subject of our discussion. The scheme has come into being and we are glad to find that the long-felt need has been attended to.

The main object of this health insurance scheme is to benefit industrial labour. The scheme introduced is of a co-operative structure resting on the contribution of the industrialists, Government and labour, the latter however getting the direct benefit out of the measure.

Though the scheme is co-operative, it would require a huge sum of money to give immediate effect to it in its entirety all over the country. It has, therefore, been planned to enforce it in stages. The Government of India have at present introduced the measure at Kanpur, a very important industrial centre of Uttar Pradesh and at Delhi. In its next stage it would be given effect to in the Punjab. Bombay and other provinces would get the benefit of the scheme in course of the next two or three years.

The scheme is aimed at providing full-time medical officers assisted by auxiliary personnel to treat the sick employees coming under the scheme at the treatment centres opened by the Government near their factory locations. There are arrangements also to attend to them in their quarters. For cases needing hospitalisation arrangements have been made in the local public hospitals. The mills and factories according to the Factories Act had to maintain treatment centres in charge of registered medical practitioners. With the introduction of Industrial Health Insurance Scheme the utility of these centres would diminish.

With whole-time staff appointed by the Government to look after the industrial population under the Insurance Scheme, the workers will have a change-over to new doctors in place of those who have earned their confidence during the time preceding the introduction of this measure. These may be the mill medical staff or the practitioners who were having independent practice in the locality. This is a definite handicap to the workers as they would be prevented under the new dispensation to get themselves treated by doctors of their own choice. The independent medical practitioners of the locality who were doing professional work in mill areas would also be affected by this measure.

Leaving aside higher administrative appointments it would have been better for an easy and helpful attainment of the purpose of the scheme, if the local medical practitioners and the medical staff already working in the industrial concerns could be associated with the scheme on part-time and consultation basis. This would have left the choice of their own doctors to the employees whose family conditions and susceptibilities were known to the doctors who were working in their midst all these years.

We have received several letters asking us about the practical aspects of the scheme. We have no hesitation to say that there is plenty of room for improvement in the scheme and much more could be achieved if the willing co-operation of the independent medical practitioners could be harnessed. But we must mention here that though the scheme should have been ushered in long before, it has at long last been recognised that the Health Insurance Schemes are the desired needs of the country and just a beginning has been made in this respect with industrial workers. In this realisation in spite of the defects of the measure, we have to congratulate the Government of India for introducing this much needed measure at the present juncture with the co-operation of the employers, employees and their own financial commitments.

We hope the defects pointed out in the aforesaid few lines will not go unheeded and we hope also that with the experience gained with the working of the scheme, it would be amended wherever necessary to meet the exigencies of the situation and no rigidity

would be allowed to pursue the same in the proverbial bureaucratic watertight fashion as in the olden days.

It would not be out of place here to say that the problem of health of the working class is not a problem with the Government alone, the industrial magnates also have an important part to play in this respect. They should be generous in their contributions so that other aspects of the question concerning the health of the working class might in course of time be fully tackled and they should note also that their contribution is an investment which would be returned to them with full profit in the long run.

Attempts have been made in this scheme to deal with cases of sickness amongst the industrial workers but the most important trend of modern scientific medicine *viz.*, to develop the preventive and social side of medicine must also be borne in mind. More stress need be given to remove the conditions that cause diseases amongst these workers in general.

Their living conditions in most cases are such, as beggar any description. Houses and their surroundings where these workers mostly live must be immediately replaced by better and hygienic dwelling houses with more living space and proper light and ventilation. Cooking must not be allowed in the living room or their appendages as is the present practice. In between houses, open spaces and children's playgrounds, as also recreational facilities, should be provided.

The Health Insurance Scheme, it seems, will be the subject of dual control of the Health and Labour Ministries and there might be difficulties in administrative control and unless a sort of a workable coordination between these ministries are ensured our apprehension might prove true.

Let this scheme be fully implemented in the country. There are other spheres also, where similar schemes need be introduced. The Government is now only on the lowest rung of the ladder; it has got to climb upwards. The agricultural and the middle-class occupations require attention. Schemes on co-operative basis as the present one should be studied for them also in the meantime and, if feasible, should be introduced by stages.

CLINICAL ESTABLISHMENTS ACT

Of late in the city of Calcutta have cropped up a large number of bath and massage clinics whose main objective appears to be to dupe the unsophisticated and earn a living out of him. Most of these establishments are run in a most clandestine fashion and there have been several raids by the local police to put a stop to this growing menace. But the existing law was found to be insufficient to cope with the situation. On the advice of legal experts the Government of West Bengal have passed the West Bengal Clinical Establishments Act of 1950 and by a special notification have introduced the provisions to be effective soon.

While we agree that the so-called massage and bath clinics were doing more harm to the society than good, and that preventive measures and definite control over these establishments were indispensably necessary, we are sorry to observe that we cannot find any justification for the inclusion of clinical laboratories and nursing homes run by registered medical practitioners all these years to be brought under the above category. These institutions are run by registered doctors expressly for clinical examination of blood, urine and other excreta and specialised treatment with the fullest amount of co-operation of the medical practitioners who refer these to these establishments. We do not remember of any complaints from any quarters on this issue. We have received expression of resentment from many of our readers about the inclusion of these laboratories and nursing homes under the provision of the Act.

We do feel that these clinical laboratories and treatment centres run by doctors should be exempted from the operation of the Clinical Establishments Act recently introduced in this province and urge upon the Government to keep such establishments outside the scope of this Act. These should come under the exemption clause of Sec. 8(2) (*d*) along with the chambers or clinics of registered medical practitioners and we do not think any invidious distinction on this score should be perpetrated. There is still time for the Government of West Bengal in the Ministry of Public Health to revise their decision and see that justice is done to the clinical laboratories run by the qualified doctors. We further exhort the Government not to brand them in the same category with massage and bath clinics. We hope our exhortations which reflect the opinion of the registered medical practitioners will not go unheeded by the Government.

We must point out in this connection the misgivings of the members of the profession that while this Act was considered the Indian Medical Association which claims to represent the medical profession of this country was never taken into confidence and its views were not taken although this body is on the list of those organisations whose opinion Government would consult on matters concerning the profession and the health of the people. While undertaking such an important piece of legislation we wonder why the national organisation of the profession was left in the cold shade of neglect. Let us hope wise counsel will at least prevail now with the Government and they would be well advised to exempt the establishments of doctors from provisions of this Act. This will mitigate the mischief to a certain extent. We hope our appeal will not go in vain.

CURRENT MEDICAL LITERATURE

A Concept of Allergy as Autonomic Dysfunction

Williams (*Ann. Otol., Rhin. & Laryng.*, March 1951, Ref. *Med. J. Australia*, 1: 17, 1952) writes that allergy may be defined as an inherited predisposition to a localized type of autonomic dysfunction, mediated by cholinergic fibres of the autonomic system. In these localized areas a stereotyped reaction of the peripheral vascular bed occurs, consisting of arteriolar spasm with atonic dilatation of the capillaries and venules. This picture, produced only by a maximal stimulus in a normal individual, may occur in certain tissues and organs of an allergic individual in response to a normally minor stimulus, or the response may take place as the result of environmental exposure to stimuli to which a normal individual would not react. These reactions result in a greater or less degree of cellular damage and the release of histamine and other toxic substances. Clinical allergy may be produced by reaction of the peripheral vascular bed resulting in the production of anoxic capillary loops, which may lead to œdema. An antigen-antibody reaction may be associated with the vascular reaction and may contribute to cellular damage. In physical allergy no antigen-antibody mechanism is present. Its normal physiological prototype may be considered the alarm reaction of Selye. In bacterial or tissue allergy the fundamental autonomic defence mechanism is retained, but this is supplemented by the development of protective antibodies. This hypothesis throws emphasis on the medical and psychosomatic aspect of the treatment of allergy, as opposed to the strictly immunological aspect. The vasodilators have been known to produce favourable effects in physical allergy, and physical agents such as heat and the hot mustard bath preceded the antihistaminics in the treatment of vasomotor rhinitis and the vasomotor stage of the common cold. Papaverine, histamine and nicotinic acid have been found to be effective vasodilators and have been used in the allergies with success. Use of tobacco in the allergies appears to be contraindicated, since smoking promotes vasospasm. A diet of low salt content and restriction of fluids have been found helpful in the allergies. In some individuals allergic reactions are produced by a relative depletion of the adrenal cortical hormones. Ascorbic acid, the precursor of corticoid hormone, has been reported as effective in relieving the symptoms of allergy in some individuals. Ascorbic acid also has a direct effect on capillary permeability. Vitamin P has been found necessary to complement the action of ascorbic acid. Ascorbic acid and rutin in dosage of 250 milligrammes three times daily have been found effective in preventing the return of allergic symptoms. The addition of certain fats to the diet of infants with eczema has been found to be helpful. When clinically significant positive skin reactions are obtained, attempts at hyposensitization are frequently beneficial. The theory of allergy based on the autonomic vascular reactions is felt to furnish a better working hypothesis from the standpoint of clinical diagnosis and treatment than one based on the antigen-antibody concept alone. Treatment by specific methods leaves much to be desired. Supplementary treatment by non-specific methods will often produce a favourable clinical result unobtainable by specific methods alone.

Atypical Facial Neuralgia in the Hypothyroid State

Watts (*Ann. Int. Md.*, 35: 187, 1951) presents twenty-nine cases illustrating a common clinical syndrome which is often overlooked, namely, atypical pain about the face and neck frequently associated with the hypothyroid state.

The pain is not severe, as in true facial neuralgia, but is rather a persistent and annoying ache. It is often associated with recurrent headaches and often with precordial pain.

The diagnosis is suggested by the above history and is substantiated by determination of the basal metabolic rate, as well as by exclusion of other disease by roentgen-ray study of the teeth sinuses.

Response to thyroid extract is generally favourable in two weeks.

Blood Pressure Variation in the Two Arms

Rueger (*Ann. Int. Med.*, 35: 1023, 1951) writes that there is a significant incidence of variation in both the systolic and diastolic blood pressure in the two arms in patients with normal and abnormal cardiovascular system.

The difference may be of vital importance to an individual in the case of examination for life insurance, employment or military service.

It is recommended that, at the time of the first examination of any individual, the blood pressure be taken in both arms and, if no significant difference is present, that the same arm be used consistently for follow-up studies.

Salicylate Action and Pituitary Gland

Van Cauwenberge (*Lancet*, 2: 374, 1951) writes that the effect of intensive salicylic-acid therapy on the urinary excretion of adrenocortical steroids led the author to investigate whether salicylates act on the suprarenal cortex directly or through the hypothalamus and the pituitary gland. Experiments were made on rats that had undergone hypophysectomy eight days earlier and on intact rats. It was found that the administration of large dose of salicylate to intact rats produces biochemical and hæmatological signs of adrenocortical hypersecretion, which cannot be observed in rats subjected to hypophysectomy. The adrenocortical hypersecretion occurring with salicylate therapy therefore depends on the pituitary.

Oculo-Oro-Genital Syndrone: A Deficiency Disease

Jacobs (*Ann. Int. Med.*, 35: 1049, 1951) writes that a deficiency disease comprised of an exfoliating dermatitis of the scrotum, stomatitis and conjunctivitis insidiously appeared in more than 75 per cent of 8,000 American prisoners-of-war after six months of an inadequate rice diet. The syndrome was quickly and markedly improved by two months of adequate diet. On return to inadequate rice diet, the syndrome was far less prevalent indicating some adaptation of the body to lowered caloric and vitamin intake. The vitamin requirements of the body appeared to be less after a loss of considerable body weight. The syndrome did not develop on a minimal diet composed of corn and soya beans. The syndrome is thought to be closely associated with pellagra, but not pellagra *per se*.

Laryngeal Tuberculosis

Bettington (*Med. J. Australia*, 1: 83, 1952) writes that laryngeal tuberculosis is found to be more common in males than in females; the age group most frequently attacked is that from twenty to thirty-five years, and the wage-earning sections of the community are more liable to infection than others.

There is evidence that two modes of infection are involved: (*i*) direct contact, (*ii*) hæmatogenous spread.

The pathology is grouped under two main headings—(*a*) proliferation (*b*) destruction.

There is a large group of symptoms depending almost entirely on the underlying pathology. In order of frequency the symptoms are as follows: (1) hoarseness, at first mild going to aphonia; (2) pain, (3) dysphagia, (4) dryness (5) dyspnœa, (6) cough.

The diagnosis is easy as a rule because of already established pulmonary disease, but in some cases separate pathological conditions are present. Also the laryngeal condition may be the first suggestion of disease, and then chest x-ray examination and sputum tests will be required.

The prognosis is improving, but is still grave.

The treatment suggested is by the avoidance of irritation and the use of short courses of streptomycin and PAS.

Antibiotics and Monilial Infection

The side-effects of antibiotics are becoming increasingly familiar. The lesions of the mouth that sometimes follow oral administration of penicillin resemble the lesions associated with vitamin-B deficiency; and at first it was thought that they were due to the inhibitory effect of penicillin on those bacteria of the bowel which normally synthesise vitamins of the B complex—a state of "conditioned" vitamin deficiency The explanation is unlikely because the lesions often appear after only a few days, long before any vitamin deficiency would be felt. Woods *et al.* (*J. A. M. A.*, 145: 207, 1951) have now shown that the lesions are due to a local disturbance in the oral flora, with an overgrowth of the fungus *Candida* (*Monilia*) *albicans*. They also describe persistent diarrhœa in patients treated with oral penicillin, 'Aureomycin,' or chloramphenicol, and have found *C. albicans* growing abundantly in the stools of such patients.

C. albicans is not necessarily pathogenic; for it is a common inhabitant of the oral, respiratory, and intestinal tracts, genitalia, and skin of normal healthy people. Under certain conditions, however, it can be pathogenic; and it is sometimes the cause of vulvovaginitis, dermatitis, and pulmonary and oral infections. Its role in the production of intestinal disease is perhaps less well established. According to Woods and his co-workers, the frequency of infection by the organism in a series of twenty-five patients receiving antibiotic therapy suggests a causal relation between the two. Harris (*Ibid* 142: 161, 1950) has reported a similar experience; he cultured *C. albicans* from the vulva, vaginal, perianal skin, and mouth of patients with lesions in these parts arising after administration of aureomycin and chloramphenicol. Where oral moniliasis follows treatment with antibiotics the antibiotic has usually been given for a sore throat; the original infection clears, and 24-72 hours later the patient begins to complain of a burning tongue, mouth, and throat. At first the tongue is thickly coated, often with overgrowth of the filiform papillæ, giving it a black or brown hairy appearance. Later the coating or hairy covering comes off, leaving a red beefy, and swollen tongue, tender to the touch and to acid or spiced foods. The buccal mucous membrane is at first covered with coalesced areas of whitish exudate like curds of milk, which become detached in 24-72 hours leaving a dry, glazed mucous membrane, which may be covered with small petechial hæmorrhages. The soft palate, uvula, aryepiglottic folds, and piriform fossæ are at first reddened and œdematous. Rarely, in some severe cases, these lesions may extend the whole length of the œsophagus.

The diarrhœa that may follow the use of antibiotics is usually mild, with the passage of three to six loose, watery stools a day, occasionally containing mucus and rarely blood: Woods and his colleagues cultured heavy growths of *C. albicans* from the stools of their cases. Willcox (*Lancet*, 2: 154, 1951) has also described an anorectal syndrome after administration of terramycin to patients for venereal disease. This is characterised by burning, soreness, and pruritus of the rectum, anus, and surrounding skin. Yeast-like organisms were found on culture of rectal smears, which makes it seem likely that this syndrome is due to moniliasis. Yogurt was prescribed in an attempt to introduce more bacteria into the bowel and diminish the overgrowth of fungi. More disturbing cases of bronchopulmonary moniliasis have been reported as complicating the antibiotic therapy of pulmonary infections.

The Council of Pharmacy and Chemistry of the American Medical Association (*J. A. M. A.*, 145: 1267, 1951) has sounded a note of warning by insisting that all bottles of the orally administered antibiotics (aureomycin, chloramphenicol and terramycin) carry a statement to the effect that when susceptible bacteria are suppressed by their use yeast-like organisms such as *C. albicans* may appear. The Council adds that in cases of lung abscess or bronchiectasis, pulmonary moniliasis may result and may prove fatal—*Lancet*, 2: Sept. 22, 1951.

Steatorrhœa Following the Use of Antibiotics

Merliss and Hoffman, (*New Eng. J. Med.*, 245: 328, 1951) write that the antibiotics—aureomycin, chloramphenicol, and terramycin—influence a wide range of bacteria and have been widely used, since they are effective orally and are reputed to be without serious toxicity. It is now realised however, that they may produce black tongue, vaginitis pruritus ani, and proctitis. More recently the occurrence of prolonged diarrhœa and pulmonary disease following the use of these antibiotics has been pointed out.

The four cases presented in this paper, in addition to the four previously reported cases, establish an etiologic relation between prolonged diarrhœa and the administration of antibiotics. Chloramphenicol aureomycin, terramycin, of penicillin-sulfonamide combinations, are the drugs chiefly responsible for this from of diarrhœa, which seems to originate in the small bowel. The presence of fat in the stools the tendency of the diarrhœa to be aggravated by fat ingestion and the relatively mild nature of the diarrhœa, are features that are commonly seen in steatorrhœa from small-bowel dysfunction. Moreover, in three cases, x-ray findings pointed to the small bowel as the source of the diarrhœa. It closely resembles the diarrhœa of the sprue syndrome. It is probably due to a deficiency state secondary to the destruction of the normal intestinal flora.

The diarrhœa responds readily to parenterally administered liver, in conjunction with ingestion of B vitamins.—*U.S.A. Medical News Letter.*

Choline in Coronary Atherosclerosis

Sola and Sola (*Settimana Med*, Florence Ref: *J.A.M.A.*, 147: 1606, 1951) observe that nineteen patients with coronary atherosclerosis were given two daily intramuscular injections of 1 gm. of choline hydrochloride supplemented in some cases

with daily oral administration of 2 or 3 gm. of choline. The total dose of choline administered varied from 8 to 88 gm. The duration of the treatment varied from 4 to 37 days. The patients' ages ranged from 48 to 74 years. Cholesterol determination, subjective and objective symptomatology, and electrocardiographic tracings were compared with the values recorded before institution of treatment. Dyspnœa and anginal pain decreased, disappearing almost completely in all patients. The pulse rate decreased from an average of 108 beats per minute to an average of 78 beats per minute. The systolic pressure dropped 20 to 40 mm. Hg. in five patients and 5 to 15 mm. Hg. in nine patients, it increased 10, 26 and 45 mm. Hg. respectively in three patients and was unchanged in two patients. The diastolic pressure dropped 5 to 20 mm. Hg. in 13 patients, increased 10 to 20 mm. Hg. in four patients, and was unchanged in the others. Diuresis increased. There was a constant and pronounced decrease of cholesterol from an average of 177 mgm. per 100 c.c. to an average of 128 mgm. per 100 c.c. Erythrocyte sedimentation rate showed a pronounced decrease. Electrocardiographic tracings presented modifications, especially in the ST segment, which tended to normalization. Best results were obtained in the patients whose hypercholesteræmia was more pronounced before treatment was instituted. Considering the rapid and beneficial therapeutic effect of choline in patients with coronary atherosclerosis, it is suggested that the drug acts to restore the elasticity of the wall of the coronary arteries rather than to cause regression of the atheromatous lesions.

Amœbiasis: Evaluation of New Therapies

Radke (*United State Armed Forces M. J.*, 2: 1231, 1951) observes that in the patients, the presence of *Endamœba histolytica* was demonstrated in material aspirated from rectosigmoidal lesions or in material aspirated from the fæcal stream in those in whom visible lesions were absent.

Thirty-five patients with amœbiasis were treated with quinacrine and carbarsone; 38, with chloroquine and carbarsone; 33, with aureomycin alone; and 33, with an aureomycin, quinacrine, and carbarsone combination. Five patients included in the quinacrine carbarsone group, 3 in the chloroquine carbarsone group, 1 in the aureomycin group, and all of those in the aureomycin-quinacrine-carbarsone group had previously been treated unsuccessfully by other means.

The quinacrine-carbarsone group usually became symptom-free within the first 5 days of treatment. The complications were: yellow discoloration of the skin in all patients and occasional nausea and vomiting, which disappeared on discontinuing therapy. The failure rate was 11 per cent.

The chloroquine-carbarsone group showed symptomatic improvement within 5 to 7 days. The complications were peculiar paresis of pupillary accommodation in almost every patient. This consisted of an inability to hold the focus longer than a few seconds. In addition most of the patients treated with these drugs had severe nausea and vomiting. In two patients, these symptoms were so severe as to necessitate discontinuing the treatment. The failure rate was 78 per cent.

The aureomycin-treated group showed symptomatic improvement of bowel symptoms, when it occurred, within 2 days. The complications were nausea, vomiting, and diarrhœa in about half of the patients. These persisted as long as the drug was continued. One patient developed a rash. The failure rate was 65 per cent.

The aureomycin-quinacrine-carbarsone-treated group usually showed improvement of bowel symptoms within the first 2 days of treatment. The complications were a drug rash in one patient and, as in the quinacrine-carbarsone group, nausea and vomiting in a few patients. The failure rate was 12 per cent.

The comparative failure rates suggest that amœbiasis can be managed by a combination of quinacrine and carbarsone, with the addition of aureomycin in severe cases and treatment failures.

Radke feels that patients with amœbiasis can be managed either with quinacrine and carbarsone or with a quinacrine aureomycin carbarsone combination, on an outpatients status. He hospitalizes only those with hepatic involvement accompanied by fever, those whom he suspects will not take the drug unless supervised, and those with severe reactions to treatment—*U.S.A. Medical News Letter.*

Chloroquine in Hepatic Amœbiasis

Sodeman and others (*Ann. Int. Med.*, 35: 331, 1951) write that seven patients with hepatic amœbiasis, two of them with an acute amœbic liver abscess and two with a chronic amœbic liver abscess, were treated with chloroquine diphosphate. Five patients received a primary dose of 1 gm. of the drug for two days, followed by 0·5 gm. daily for two or three weeks, the dose schedule recommended by Conan. The two patients with acute amœbic hepatitis were given double this dosage. Results confirmed the effectiveness of chloroquine in hepatic amœbiasis. Prompt recovery occurred in four patients. In three patients primary failure of the drug with subsequent success showed the importance of multiple factors in successful therapy and indicated that diagnosis by therapeutic trial with chloroquine may not be feasible, for failure to respond to chloroquine does not rule out amœbic hepatic disease. As with emetine, negative therapeutic tests with chloroquine must be interpreted with caution. The dose schedule recommended by Conan seems generally satisfactory. If there is no response, the dose may be increased, as in two of the author's patients, before the drug is considered a failure, and even then, if there is no response, the drug may be observed to act later when other therapeutic procedures, such as drainage, are added. These procedures are at times determinants of the effectiveness of chloroquine, just as they are with emetine. No evidence of serious chloroquine toxicity was observed in the seven patients.

Infection in Cholecystitis

Twiss and others (*J. A. M. A.*, 147: 1226, 1951) give in the following lines the summary of their observations:

A study has been made of 259 patients with chronic cholecystitis coming to operation. Pre-operative and post-operative cultures of the duodenal bile were obtained, as well as cultures from al parts of the biliary tract at operation. Operative cultures were positive in 73, or 28 per cent, of the patients, and were sterile in all parts of the biliary tract in 186, or 72 per cent of the patients.

The sterile and infected groups had a similar incidence of symptoms and abnormal physical findings, as well as the same percentages of abnormal cholecystograms.

Gross and microscopic pathologic examinations showed no significant differences in the sterile and infected groups.

In the group of 186 patients sterile in all parts of the biliary tract at operation, the results of pre-operative doude-

nal drainages in 100 patients gave one or more sterile cultures in 85 per cent of those with free hydrochloric acid and in 61 per cent of those having no free acid. Fifty patients with sterile preoperative cultures, practically all having free acid, remained sterile postoperatively. Of 32 patients having no free hydrochloric acid, 10 showed only post-operative positive cultures of duodenal bile.

In the group of 73 patients with pathogenic organisms in the biliary tract at operation, the predominating organisms were Escherichia coli, Salmonella typhosa, non-hæmolytic Streptococcus, alpha hæmolytic Streptococcus (green), Klebsiella pneumoniæ (Friedlander's bacillus), and Proteus vulgaris. Stones were positive in 31 of 52 cases, the common duct bile and cystic node cultures were positive in all but one case each. Eighty-seven per cent of 73 pre-operative duodenal drainages showed pathogenic organisms. The six patients having sterile pre-operative cultures had sterile gallbladder bile at operation. Post-operative drainages showed sterile cultures of duodenal bile in 10 out of 11 typhoid carriers and in all patients having free acid with pure colon or Streptococcus infections. In the majority of the patients having no free acid and in those having acid with mixed cultures at operation, the duodenal bile remained positive.

In both the sterile and the infected groups, there were the same incidence and type of pathologic changes and stones, suggesting that infection was superimposed upon previously existing pathologic conditions.

The presence of active infection, however, makes the condition of the patient far more serious. Infectious cholecystitis can be cured only if treated in the early stages by cholecystectomy.

The early recognition of biliary tract infection is for the most part dependent upon the demonstration of pathogenic organisms in the duodenal bile. With suitable sterile precautions this can be done accurately in the majority of patients.

NOTES AND NEWS

CENTRAL GOVERNMENT'S SCHEMES FOR PROMOTION OF NATIONAL HEALTH

The Ministry of Health proposes to introduce a Contributory Health Service for government employees in Delhi and New Delhi. The scheme is intended to provide a more satisfactory service to the government servants and their families.

The problem of population control is also engaging the attention of the government, at whose instance Dr. Abraham Stone, W.H.O. Consultant on Population Control and Family Planning recently visited India to survey and study the population problem. His report is under consideration and it is expected that an early start will be made in the field of family planning based on what is called "the Rhythm Method" with the assistance of two W.H.O. field workers.

The Government of India have decided to develop in collaboration with U.N.I.C.E.F. the existing Maternity and Child Welfare Section of the All-India Institute of Hygiene and Public Health, Calcutta, into a Department of Maternal and Child Health to serve as a national training centre for child health workers with certain international obligation.

There is also a proposal under consideration for the establishment of a permanent physiotherapy school and centre at the K.E.M. Hospital, Bombay, so that it may function as an organisation for the training of physiotherapists from different parts of the country.

ALL-INDIA MEDICAL INSTITUTE FOR DELHI

Mr. J. T. Watts, New Zealand Minister for Industries and Commerce, laid the foundation stone of the All-India Medical Institute, headquarters of an ambitious scheme to raise medical standards throughout the country, in the grounds of New Delhi's Irwin Hospital.

An offer of £1,000,000 by the New Zealand Government to India under the Colombo Plan has made it possible to get the scheme, under Government consideration for a long time, under way. Laying the foundation stone, and placing Indian and New Zealand coins under it, Mr. Watts said that it was the earnest hope of the people of New Zealand that "upon this foundation stone will be erected an edifice noble in its proportions, giving happiness to those who work in it, serving the hospital to which it is attached, and worthy of the cause to which it is dedicated."

Thanking the New Zealand Government for their generosity, Rajkumari Amrit Kaur said that, without their aid, "it would not have been possible to start on this venture."

A model of the proposed institute displayed near the foundation stone revealed an impressive, modern three-storeyed building with three main and two small wings connected by a central block. It will be constructed in the south-west corner of the Irwin Hospital grounds.

Describing the basic conceptions of the Colombo Plan, Mr. Watts said they were "first, that the countries of South and South-East Asia must, from their own resources of wealth and manpower, provide the means of improving the lot of the common man in these areas; and secondly, that the more developed countries, particularly of the Commonwealth should endeavour, by material and technical assistance, to bridge the gap left in the plans of the countries concerned.

The Colombo Plan was a sober and realistic endeavour to reach an ascertainable goal in the next five years and provide more food and other essential facilities to the peoples in the area.

He emphasized that the projects for various countries were their own work and not the conceptions of outsiders. New Zealand was contributing £3,000,000 spread over the first three years, after which the position would be reviewed, and £400,000 in technical assistance.

Mr. Watts said that his country felt it most appropriate to be associated with the establishment of the medical institute because they had always laid great emphasis on the provision of adequate health facilities and had a free health and medical scheme, practically universal in its scope.

In all the places in South and South-East Asia he had visited lately, he said, he received "the impression of urgency and endeavour that has characterized the Governments and peoples of these areas." In spite of the many problems India had faced since she gained independence, one could "draw undoubted hope and optimism in the very great achievement of these few years."

Describing the objects of the institute, Rajkumari Amrit Kaur said it was to be an All-India institute in the real sense of the term with branches all over the country. It was therefore essential "not only to lay down a uniform standard of medical education for the entire country but also to create

within all limbs of the medical profession a feeling that they do not belong to any particular State. Medical students, nurses, research scholars and auxiliary personnel who will receive training under the aegis of this institute will be drawn from all over India on the basis of merit only.

EDUCATIONAL TOUR IN EUROPE FOR DOCTORS

A six weeks' educational and cultural tour of Europe for Indian doctors, writers and other professional people of good standing who would be willing to give talks in English (or demonstrate) on some aspects of their work for the benefit of European audiences interested in India, has been arranged.

The tour will be made by private motor coach throughout and will leave London on June 10th, returning there on July, 22nd. France, French Riviera, Switzerland, Italy, Belgium, Holland, Luxemburg, Germany, Norway, Sweden and Denmark will be visited.

The total cost will be £140 per person, including all travelling expenses, hotel accommodation and full board.

There will be also opportunities to visit various European hospitals.

Applications from intending tourists must be sent to the organiser, Mr. Hingorani, 128 Harley Street, W. 1, London, without any delay and by air mail to ensure reservation of seats.

The cost of the tour it should be noted does not, of course, include the fare from India to London. Members coming from India must make their own arrangements, either by air or by sea for this part of their journey.

INTERNATIONAL CONGRESS OF DOCTORS IN ITALY

It has been proposed to hold an International Congress of Doctors in Italy this year. The object of this Congress is to study (1) the harmful effects of war preparations among nations, and (2) the development of medical science and the maintenance of peace. In explaining the object further, the sponsors have stated,

> "The drive towards war goes on with increasing fury and the situation is so alarming that even professional men like doctors who do not normally express themselves on political matters are forced to raise their voices. The question of peace and war is no more a mere political question and has become one of our very existence and must therefore concern every citizen."

This conference, it appears, will approach the problem only from the point of view of the medical profession and is open to all doctors no matter what political or other views they hold.

SYMPOSIUM ON SEX HORMONES

Hormones in general, and sex hormones in particular, form a very fascinating subject for study, not only to the research worker but to the practical clinician as well. A symposium on sex hormones was held in the Central Drug Research Institute (of India) at Lucknow, towards the middle of February last. It is well-known that results of animal experiments with sex hormones are not always reproduced in man. Moreover experiences with clinical applications of sex hormones in different countries do not always agree. Dissimilar clinical results in different countries may be due to many factors, particularly differences in climate, health, stature and build, dietetic habits, emotional set-up and conditions connected with storage and distribution. This February symposium has brought about a pooling of all the available informations, from the research and also the clinical fields, about sex hormones from all over India. The end results will be eagerly awaited and bids fair a good reception.

BOMBAY MEDICAL COUNCIL

The following are the excerpts from the minutes of the Bombay Medical Council held on 17th and 18th March, 1952:

(1) That the Council do judge Dr. D. Y. Manohar, L.C.P.S. (BOM.), to have been guilty of infamous conduct in a professional respect but do postpone for a period of six months the making of a direction for the removal of his name from the Medical Register.

(2) That the Council do judge Dr. (Miss) V. S. Bhonsle, L.C.P.S. (BOM.), to have been guilty of infamous conduct in a professional respect but do postpone for a period of one year the making of a direction for the removal of her name from the Medical Register.

(3) That the Council do judge Dr. V. G. Kulkarni L.C.P.S. (BOM.), to have been guilty of infamous conduct in a professional respect but do postpone for a period of two years the making of a direction for the removal of his name from the Medical Register.

SPECIAL CONFERENCE NUMBER

It has been decided to bring out a *special issue* of the Journal of the Indian Medical Association *in the last week of May, 1952*. This special number will contain the deliberations of the third Commonwealth Medical Conference held on the 20th, 21st and 22nd March, 1952 in Calcutta under the presidency of Hon'ble Dr. B. C. Roy, and also of the 28th All-India Medical Conference held at Ahmedabad in February, 1952 under the presidency of Dr. T. S. Tirumurti. This special issue will have a circulation of 17,000 copies covering not only the whole of India, but also the commonwealth countries abroad. For details please write to the Hony. Secretary, Journal of the Indian Medical Association, 23, Samavaya Mansions, Calcutta 13.

EDITOR, *J. Indian M. A.*

CORRESPONDENCE

The Editor is not responsible for any views expressed by contributors

HAEMOLYTIC DISEASE OF THE NEWBORN

Sir,—Will any of my professional brothers let me know through the medium of this Journal whom to consult for a child of about 2 years. He suffered hæmolytic disease of the newborn. There is great mental retardation of the child. There is in the opinion of experts KERNICTERUS resulting from original hæmolytic disease. The child otherwise appears to be well fed and physically developed.

I shall be very thankful to the profession for this. I am, etc.

1-4-52,
Abohar, Dt. Ferozepur, East Punjab. — TARA CHAND, M.B.B.S.,

HELIOTHERAPY IN TUBERCULOSIS AND OTHER AILMENTS

Sir,—I feel that time has come for the medical profession in India to seriously consider the question of adopting heliotherapy as an important adjunct in the treatment of tuberculosis and other ailments. Therefore it will be helpful to be advised if—

(1) sunlight has any curative value or it acts as an adjunct to other forms of therapy;

(2) it is applicable in pulmonary tuberculosis—if not, why not; and if

(3) it helps convalescence. If so, its mode of action.

I am etc.

18-3-1952,
Calcutta. — S. N. SINHA,
Registrar, Calcutta Police Hospital.

THE PROBLEM OF THE BLIND

Sir,—For a long time to come, the problem of the blind will remain the foremost of our socio-medical questions. So far, by its emotional appeal alone, it has often claimed the individual and collective attention of the social workers by rousing their social conscience. But the medical man in general, has complacently come to regard himself absolved of its twin social and medical responsibility, by entrusting it to the ophthalmologist. Indeed, the oculist must and always shall bear the final burden of curing the blind, but to successfully solve the many complex aspects of this intricate socio-medical problem, he actively needs the help and understanding of his fellow workers in different medical fields, as much as he needs the help of the purely lay social worker.

Blindness has to be fundamentally classified as curable and incurable. The question of the curable blinds is mostly medical. The etiological factors contributing towards complete or incomplete visual failure are familiar to all. But with the progress of civilisation, industrial hazards are being added to the etiology of blindness. So the physician, the surgeon, the neuro-surgeon, the obstetrician, and the industrial physician should join hands with the eye physician in the war against blindness. All curable blindness are often preventable. Hence it is imperative that an alert physician should anticipate ophthalmic complication in any disease or condition likely to bring about visual failure. Below in brief are the few ways, by means of which a physician can help to combat and prevent visual crippling.

1. By considering visual disability as the most crippling of acquired defects.

2. By promptly demanding and availing of the services of an oculist whenever necessary.

3. By fortifying oneself with the basic knowledge of the diseases and conditions leading to visual loss or defect.

To every practising ophthalmologist, prevention of blindness is a vital matter. To make his work easier and more successful he must demand the separation of the curables from the incurable blinds. He must declare to his colleagues that his attempts at the restoration of the sight are not the mere result of some chance skill, but often the outcome of better and finer equipment, and the efficient team-work of his staff. He must create centres and laboratories for the study, research and ultimate solution of the many unsolved problems of his speciality. India is the home of many blinding diseases peculiar to it, their successful treatment should and must come from the doctors of India.

When we consider the social aspects of the problem the oculist and his colleagues must sail in the same boat. Here the question is of the incurable blinds. The social worker has to be taught to look at it with realistic understanding and without emotion. Re-education and employment of the sightless are the main objectives. Psychologically the sightless has to be helped to recreate a new and vigorous self, that can, not only sustain him, but also enable him to make a healthy contribution towards the well-being of others. As for the employment of the blind all physicians can indeed help in more ways than one. Following are some such suggestions:

1. By preferentially employing the partially sighted, in professional and domestic establishment. By the very nature of their misfortune, the blind are ideally suited for the more humane treatment of the sick. Their dominant kindness often makes ample amends for their small lack of the required efficiency. As ward-boys and sick companions they should come to be almost irreplaceable.

2. Many a medical man has or can afford to keep a dog as a pet. With his better civic sense and understanding of visual disability, a doctor can more easily and properly train his dog as a companion for the blind.

Such trained dogs have come to be accepted as 'seeing eyes' for the totally blind in the western countries. These dogs help the blind to go about safely through the dangers of city traffic. For any medical man the pleasure of training such a dog is certain to be multiplied by the resulting benevolent usefulness of the animal for the sightless.

3. Philanthropy is natural for a doctor, but in individual charity he has to be professionally discriminate. Till the curables are not weeded out from the incurables by proper legislation and certification, a physician must learn to direct his charity towards the incurables alone. His efforts must also be directed towards sending the curables to the ophthalmic institutions and the incurables into the homes for the blind.

4. A word about the social aspect of trachoma as it concerns the medical man. It is the largest single factor that brings about partial or total visual failure. Its spread is as dangerous as it is easy to control. Whatever the special field of work of a physician, it must medically and socially embrace an effort to prevent the spread of trachoma, wherever it is suspected.

The problem of the blind is too complex, medically, socially and economically, to offer any immediate, simple or comprehensive solution. The above letter is only an attempt-

ed simplification without the technicalities or details, of the foremost topical question in social medicine, as it strikes an ordinary medical man. I am etc.

26-1-1952,
19, Pherozshah Mehta Road, V. V. GUPTE.
Bombay-1.

NON-RECOGNITION OF REGISTERED MEDICAL PRACTITIONER'S CERTIFICATE

Sir—The President of the District Board, Anantapur has recently thought it fit to refuse to recognise and accept the medical certificate issued by a private medical practitioner in his letter dated 14-3-52, addressed to Mr. B. V. Sanjeevarayudu, Assistant Teacher, Amaladinna Elementary School to whom I granted a medical certificate for a period of one month from 25-2-52 to 25-3-52 for treatment of acute dysentery and rheumatism. The President asked the patient to see the District Medical Officer, Bellary, and refused to accept my certificate. In his action he has lowered the prestige and dignity of the private practitioners in general and myself in particular.

I am a practitioner of 30 years standing and this is the first instance when my certificate is questioned. I hope you will kindly move in the matter and do the needful in the interest of fair play and justice. I am etc.

24-3-52,
Bellary. U. K. L. NARAYANA RAO, L.M.P.,

PROFESSION VILIFIED IN FILM

Sir,—I was greatly mortified to see the portrait of the doctor as depicted in Gemini's Film "SANSAR."

A lady in distress implored a well reputed doctor of the locality to go and attend to her sick husband. The doctor demanded an exorbitant fee and also asked another good sum for the cost of medicine before paying the visit. The lady in anxiety to save her husband went and begged money from the rich employer of her son. On his refusal she knocked him down unconscious, robbed his purse went back to the doctor and paid him the money in advance. The doctor even then refused to go with her as he had to go and see a very rich and influential patient (the man who was knocked down by the lady). Enraged at this the lady attempted to strangle him, after which the doctor accompanied her to the bedside of her ailing husband.

This portrait might have been necessary from the cinematographic point of view to heighten the tempo of action and intensify the melodramatic effect but the entire picture is divorced of reality, seldom seen or heard of in real life.

This type of picture definitely lowers the prestige and good name of the medical men before the public eye.

I would therefore request you to lodge an emphatic protest to the producer of this film from our Association. I am etc.

Asansol. S. L. ROY.

A CASE OF BENIGN LYMPHOCYTIC MENINGITIS

Ranu Chowdhury, H. M. 12 yrs., in the early part of March 1951, went out of Calcutta for 4 days where he exposed himself to the scorching heat of the sun. He got fever on his return to the city, the temperature rising in the evening to 99°F.

He was soon put to bed but as the temperature persisted he was given quinine with an alkaline mixture which brought down the temperature. Quinine was continued for 2 more days and on the 6th day he was allowed to move about. He played football and got another bout of fever. The same medicines were administered and he responded well to the treatment. He remained well for 4 days *i.e.*, till the 17th day. He was allowed to join school but after 2 days he got another relapse. Quinine and alkali had no effect this time.

From the 19th day the temperature became of remittent type ranging between 99°F and 101°F. He complained of nausea, frontal headache and constipation. Blood examination revealed white cell counts as 17,000 per c.mm. with poly 90 per cent and lympho 10 per cent.

Bowels were opened with glycerine enema and the patient was put on an effervescent alkaline mixture with triple bromides and procaine penicillin 400,000 units injection daily. This treatment did not produce any beneficial effect; the headache became worse though nausea became less. Novalgin and luminal in powder form gave him a slight relief.

There was no stiffness of the neck neither was the Kernig's sign positive though they were looked for from the beginning. Pupils were normal but reacted sluggishly to light.

Four days after the relapse *i.e.*, on the 23rd day he complained of pain in the neck muscles. The movement of the neck was met with resistance but the Kernig's sign was still negative. The patient was quite conscious though at night he talked incoherently and became restless.

Penicillin was stopped and M. & B. 693, 1 gm. was given by injection daily. The temperature came down and ranged between 98·4°F and 99°F but the headache continued with the same severity. Pupils were equal but slightly dilated and were sluggish to light.

Lumbar puncture revealed clear fluid under normal pressure with total cell count of 40 cells per c.mm. of which lympho were 75 per cent and poly 25 per cent, chlorides—808·3 mgm., sugar—43·5 mgm. and total protein—100 mgm. per 100 c.c. No pathogenic organisms were found.

M. & B. 693 injections were stopped and the patient was put on the following: Alkaline bromide mixture, novalgin and phenobarbitone powders and hexamine glucose injections. The temperature gradually came down and the symptoms subsided. The convalescence though prolonged was uneventful when the patient had nutritious diet and a mixture containing iron, quinine and phosphoric acid.

Differential diagnosis is to be made from tuberculous meningitis which is also insidious in onset, slow in progress and where the blood picture may be the same. Only difference is in the c.s. fluid. In benign lymphocytic meningitis chloride and sugar remain near about the normal level and no pathogenic organisms are detected whereas in tuberculous type sugar content becomes as low as 10 to 30 mgm. (normal 48 to 58 mgm.) and chloride 650 mgm. or still lower (normal 750 mgm.) and the centrifuged specimen may show tubercle bacilli. In meningococcal meningitis the c.s. fluid is turbid and under increased pressure and contains meningococci with increase in protein content, diminution of chloride and absence of sugar.

Prognosis is usually favourable in this type of case. We are etc.

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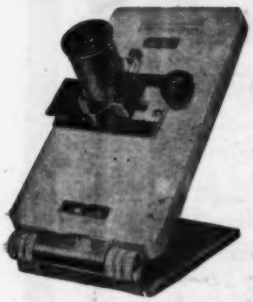

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Case 1. MANIA **Care of Dr.....MD.**

Sex-female **Age-40. Complaints :** Loss of temper maniacal outbursts-loss of appetite. **Clinical Symptoms :** Insomnia mania, rolling, abstinence of food, hostile attitude, to every body particularly towards her daughter in-law and mother. symptoms more marked in the presence of her husband. **Previous Treatment :** treated with Oestrogenic hormones and Phenobarbitons. **TREATMENT WITH SILEDIN :** Only **SILEDIN** has been given with good results **Special Remarks :** Epilepsy and Hysterical element for many years.

Case 2. ADOLESCENT INSANITY-SCHIZOPHRENIA **Care of Dr.....MBBS.**

Female, **Age 30, Occupation :** Home work. **Complaints :** (i) Somebody will take away my ornaments to sell them away (ii) I wish that my brothers and father should be ruined (iii) Somebody is going to break my house etc. **Clinical Symptoms :** (i) To sit silently and idle not to do any work (ii) no proper sleep (iii) a look of dum-idiot (iv) nothing abnormal was detected on physical exam-patient is a sterile-married life of 16 years. **Previous Treatments :** Nicotinic acid and injections and tablets in large doses for three weeks—no remarkable results. **Treatment with SILEDIN :** One tablet three times a day was given-with one bottle of fifty the mental condition was completely improved without leaving any trace of the former disorders—In all 100 tablets are given-patient has put up good amount of weight-looks very healthy and mentally-perfectly all right.

Case 3. ANXIETY NEUROSIS **Care of Dr.....LSPS. DPS. LM.**

Sex : Female, **Age 42—Occupation :** Household work. **Complaints :** Afraid to come out of bed-thinks she is very weak-at times irrelevant in talk-anxious look. **Clinical Symptoms :** Anxiety Neurosis. **Other Reports :** General debility-poor nourishment. **Treatment with SILEDIN :** 2 tabs. twice a day for one month **Remarks :** After four days treatment the facial look of anxiousness improved-after a week complete improvement. Treatment was however continued for one month.

Case 4. SCHIZOPHRENIA **Care of Dr..... LCPS**

Occupation : Male nurse in mental hospital. **Complaints :** Insomnia-fear as if Police is following-nearest and dearest appeared as enemies-suspicious as if he would be poisoned-blankness in head. **Clinical Symptoms :** Vacant facet dyspepsia-tender hepatic region. **Previous Treatments :** Electric shock Therapy-temporary improvements.

Treatment with SILEDIN : Has been taking **SILEDIN and LEPTADIN** for the last one month with definite improvement—no other treatment prescribed. **Remarks :** The patient says "there is a great relief after taking medicine. I am taking regularly for the last 15 days I am getting very good sleep. Indigestion is cured and get regular motions. Head remains very calm." After about two months he says : "I am feeling complete relief by the treatment."

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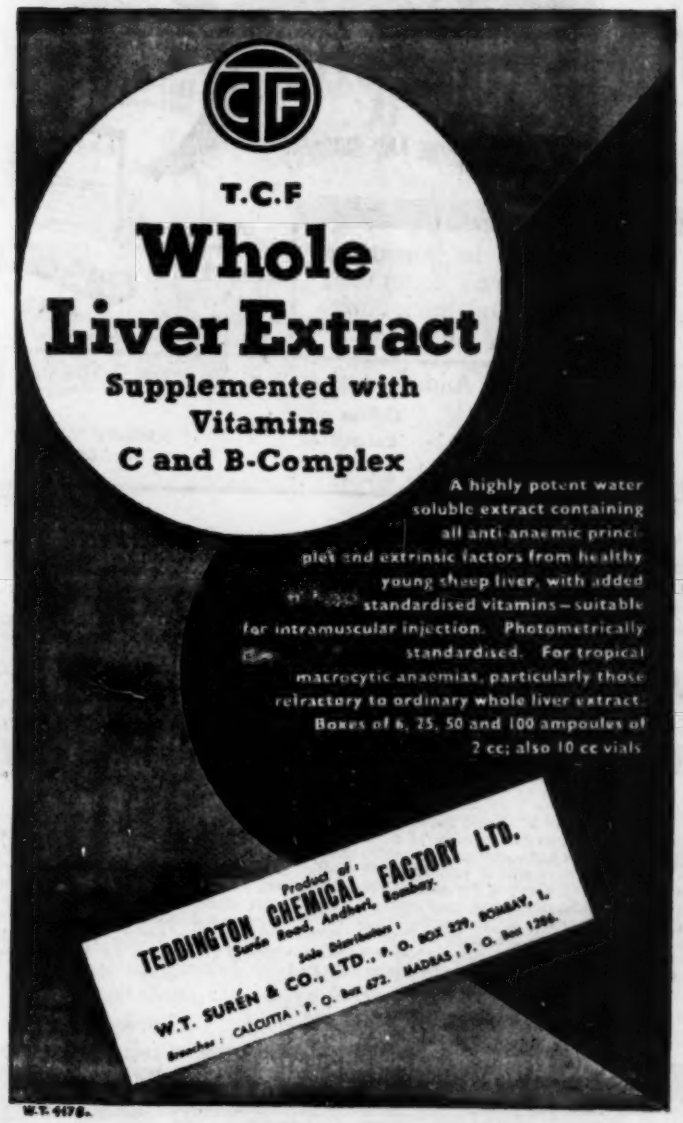
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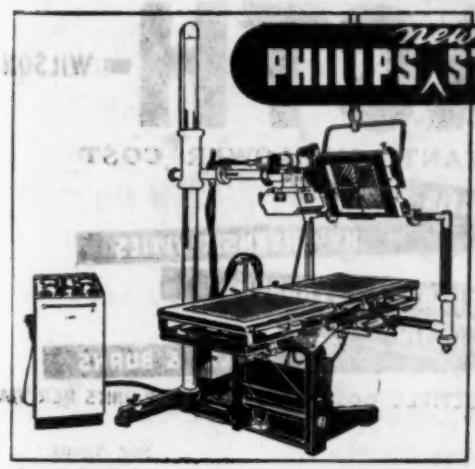

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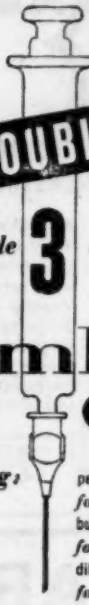

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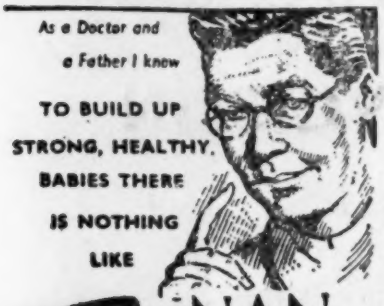

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